FINAL REPORT

THE BELLEDUNE AREA ENVIRONMENTAL SAMPLING STUDY

PROVINCE OF NEW BRUNSWICK
DEPARTMENT OF HEALTH

PROJECT NO. 1001701

Jacques
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REPORT TO	**Dr. Christofer Balram** **Carleton Place** **520 King Street** **Fredericton, NB** **E3B 6G3**
FOR	**Province of New Brunswick** **Department of Health**
ON	**The Belledune Area Environmental Sampling Study**

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EXECUTIVE SUMMARY

Jacques Whitford has completed an environmental sampling program in the Greater Belledune Area (GBA) on behalf of the New Brunswick Department of Health (NBDH). The program consisted of the sampling of garden produce, soil, finfish and bivalve mollusks in the GBA and was a follow-up to the Belledune Area Health Study (BAHS) that was released in May, 2005.

Objectives

This study is intended to fulfill specific recommendations made within the BAHS. The fundamental objective was to obtain data that accurately reflects the reality of the current situation in the GBA. Results from this project were compared to the data used in the BAHS to validate the assumptions used in that study. Comparisons were also made between sub-areas of the GBA and control samples, where available.

Study Design

The following recommendations were contained in the BAHS and were the focus of this study:

- Programs be implemented in the GBA to determine representative metal concentrations in finfish from the Baie des Chaleurs. It was also considered prudent to collect comparable data from shellfish; and

- A program be implemented to determine representative metal concentrations in garden produce across the GBA.

The BAHS determined that lead and cadmium exposures were influenced by industrial activity in the GBA. Therefore, lead and cadmium were carried forward as the chemicals of potential concern (CoPCs) of local interest for the purpose of this project.

The study area for garden produce was defined as the same study area described in the BAHS, notably: the villages of Belledune, Pointe-Verte, and Petit-Rocher and local service districts. Based on the BAHS, the areas within Belledune denoted as Townsite #2 and Lower Belledune were also sampled as discrete areas. The study area for finfish and bivalve mollusks included the portion of the Baie des Chaleurs immediately surrounding the GBA, including near-shore waters off Belledune, Pointe-Verte, and Petit-Rocher. Freshwater fish were also caught in the Belledune River, the Elmtree River and the Little Elmtree River.

An inventory of what the local residents were growing in their respective gardens during the sampling period (*i.e.*, July/August, 2005) determined which vegetables were sampled in order to obtain a representative sample of what was grown in each garden. The categories of produce sampled included:

- aboveground exposed vegetables (AE), such as: beans, swiss chard, artichoke, herbs, snow peas, peppers, lettuce, cabbage, spinach, cauliflower, broccoli, celery and green onion

- aboveground protected vegetables (AP), such as: cucumbers, sunflowers, melon, peas, pumpkin, corn, squash and zucchini
- belowground vegetables (B), such as: potatoes, beets, onions, carrots, parsnips, radishes, shallots and turnips
- fruit (F), such as: tomatoes, raspberries, strawberries, plums, apples, grapes, rhubarb, gooseberries, currants, blueberries, pears, cherries, crabapples and watermelons

From the information sessions and the questionnaire we confirmed what species of finfish and bivalve mollusks are fished and consumed in the Baie des Chaleurs surrounding the GBA. Bivalve mollusk species sampled included blue mussels (*Mytilus edulis*) and soft-shelled clams (*Mya arenaria*) all of which were found in the inter-tidal zone in brackish and marine waters. Finfish species sampled included Atlantic mackerel (*Scomber scrombrus*), trout (*Salvenis* fontinalis), and American smelt (*Osmerus mordax*).

Public Participation

Participation of the local residents was key to the success of this project. A comprehensive public communication process was undertaken to solicit volunteers and information, including:

- Advertisements in local and provincial news media;
- Posters in village municipal buildings;
- Delivery of questionnaires to every resident in the GBA;
- Two public information sessions in Belledune and Petit Rocher;
- Information booth at Belledune Days;
- Door to door canvassing; and
- Toll free phone line.

Through this communication process, a total of 74 gardens were solicited (7 were soil only sites), as follows:

- 15 in Belledune (BD)
- 16 in Lower Belledune (LBD)
- 15 in Townsite #2 (TS)
- 15 in Pointe-Verte (PV)
- 13 in Petit-Rocher (PR)

In total, 74 gardens were included in the study, yielding 446 produce samples and 98 soil samples from the GBA. In addition, 84 produce control samples were collected in Fredericton and surrounding area. A total of 102 finfish and 36 bivalve mollusks samples were collected from the near-shore and inter-tidal areas within the GBA.

Belledune Area Health Study EPC Development

Various data were used in the BAHS to develop EPCs. The sources of these EPCs are described in the following paragraph.

The soil EPCs presented in the BAHS for cadmium and lead are understood to have been developed for soil based on both Noranda and Conservation Council of New Brunswick (CCNB) data. In general, mean values were adopted as the best estimate EPCs in each sub-area of the GBA. Upper bound EPCs generally adopted the Upper Confidence Limit (UCL) of the mean.

The garden vegetable EPCs presented in the BAHS for cadmium and lead are understood to have been developed based on the summary of monitoring measurements collected from the Noranda Environmental Monitoring Program (EMP). The mean of all measured concentrations was used as the best estimate EPCs. For BD, PV and PR, the upper bound EPC was set equal to the UCLM and for TS and LBD, the maximum measured concentration for an individual measurement was used as the upper bound EPC.

The fish EPCs presented in the BAHS for cadmium and lead are understood to have been based on measurements made prior to 1985. The best estimate EPC was set equal to the mean concentration and this value was used for all sub-areas of the GBA since fish are considered to be mobile in the Baie des Chaleurs. The upper bound EPC was set equal to the UCLM of the measured data for all sub-areas of the GBA.

Results

The tables indicate whether the results from this study for each GBA sub-area are statistically significantly higher (ANOVA $p < 0.05$), statistically significantly lower (ANOVA $p > 0.05$) or not statistically different (NSD) (ANOVA $p = 1$) from control samples and/or the BAHS best estimate or upper bound EPCs.

Summary of Results

		BAHS EPCs	
	Control Samples	**Best Estimate**	**Upper Bound**
	Belledune		
Cadmium			
Soil	Higher	NSD	NSD
Aboveground Protected Produce	NSD	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	NSD
Lead			
Soil	Higher	Higher	NSD
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	NSD

Summary of Results

		BAHS EPCs	
	Control Samples	Best Estimate	Upper Bound
	Townsite #2		
Cadmium			
Soil	Higher	Lower	Lower
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	NSD	NSD
Fruit	Higher	Lower	Lower
Finfish	--	--	--
Bivalve Mollusks	--	--	--
Lead			
Soil	Higher	NSD	Lower
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	--	--
Bivalve Mollusks	--	--	--
	Lower Belledune		
Cadmium			
Soil	Higher	NSD	Lower
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	NSD	NSD
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	NSD	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	Lower	Lower
Lead			
Soil	Higher	NSD	Lower
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	Higher	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	NSD
	Pointe-Verte		
Cadmium			
Soil	Higher	NSD	NSD
Aboveground Protected Produce	NSD	Lower	Lower
Aboveground Exposed Produce	NSD	NSD	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	Lower	Lower
Lead			
Soil	Higher	NSD	NSD
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	Higher	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	NSD	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	NSD

Summary of Results

		BAHS EPCs	
	Control Samples	Best Estimate	Upper Bound
	Petit Rocher		
Cadmium			
Soil	Higher	Higher	Higher
Aboveground Protected Produce	NSD	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	Lower	Lower
Lead			
Soil	Higher	Higher	NSD
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	NSD	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	Lower

It must be noted that although soil lead concentrations in BD and PR for this study were determined to be statistically significantly higher than the BAHS best estimate EPC, both results from this study as well as the BAHS EPC are lower than the CCME residential soil quality guideline for lead of 140 mg/kg.

Although soil cadmium concentrations in PR for this study were determined to be statistically significantly higher than the BAHS best estimate and upper bound EPCs, both results from this study as well as the BAHS EPCs are lower than the CCME residential soil quality guideline for cadmium of 10 mg/kg.

In general, the results of this study yield two summary conclusions:

1) Cadmium and lead concentrations measured in soil, produce, finfish, and bivalve mollusks are generally lower than, or not statistically different from the EPCs used in the BAHS. Therefore, these results validate that the EPC assumptions used in the BAHS for these environmental media were appropriate and conservative.

2) Cadmium and lead concentrations measured in soil and produce in the GBA are often higher than the cadmium and lead concentrations measured in equivalent control samples from outside the GBA.

Given these results, SENES was asked to use the site specific data collected by Jacques Whitford to substitute into the risk calculations that were carried out for the BAHS which was finished in 2005. Their results are provided verbatim in the following section and details are provided in Appendix F.

Summary of SENES Risk Assessment Update for Belledune Area

According to SENES:

"In summary, the use of the 2005 measured data does not substantially change the results of the previous risk assessment. This current assessment has demonstrated the following:

- *The backyard vegetable and fruit concentrations represent a very small portion of the exposure to individuals living in the Belledune area and thus any changes in EPC concentrations between the two risk assessments does not impact the overall results.*
- *A reduction in the uncertainty in the fish data has occurred, especially for lead, indicating that fish consumption is not a major exposure pathway.*

Mussel consumption is still a major exposure pathway for both cadmium and lead. However, the revised mussel EPCs were still uncertain due to the small number of samples. The removal of this exposure pathway results in cadmium and lead exposures that are below their respective TRVs."

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Jacques
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THE BELLEDUNE AREA ENVIRONMENTAL SAMPLING STUDY

1.0 INTRODUCTION

Jacques Whitford was commissioned by the New Brunswick Department of Health (NBDH) to conduct sampling of garden produce, soil, finfish and bivalve mollusks in the Greater Belledune Area (GBA). This sampling was a follow-up to the Belledune Area Health Study (BAHS) that was released in May, 2005 and fulfills the specific recommendations made within the BAHS.

The purpose of this report is to present the results from this study, which provide the distribution of lead and cadmium concentrations in produce, soil, finfish and bivalve mollusks samples collected at sampling sites in the GBA. A statistical comparison was conducted of the results from this study to the data used in the BAHS in order to validate the assumptions used in the BAHS.

This document is divided into six sections, as follows:

- Section 1.0 - Introduction including background information, study objectives, and definition of chemicals of potential concern (CoPC), study area and study design for both Project A - metal concentrations in backyard produce and Project B – metal concentrations in finfish and bivalve mollusks.
- Section 2.0 - Public Communication Process describes our means of interaction with the residents of the GBA which includes media announcements, delivery of a questionnaire, public information sessions, door-to-door canvassing and the public notification of the sampling phase.
- Section 3.0 - Soil and Produce includes the sampling protocol for soil and produce as well as sample preparation, laboratory analysis, and results.
- Section 4.0 - Finfish and Bivalve mollusks includes the sampling protocol for bivalve mollusk and finfish as well as sample preparation, laboratory analysis, quality assurance/quality control (QA/QC) and results.
- The conclusions are reported in Section 5.0.
- All references used in this report are listed in Section 6.0.

1.1 Background and Definition of Chemical of Potential Concern (CoPC)

The NBDH released the findings obtained from the BAHS in May, 2005. In some instances the limited available data was insufficient to provide the necessary level of confidence in the results. Two limitations in the data used for the BAHS were identified as:

- **Uncertainty in current concentrations of CoPC in Baie des Chaleurs fish** - Due to a lack of current data, fish data collected in the 1980s was used to estimate current exposure; therefore, introducing the possibility that current fish concentrations are significantly different from these estimates.
- **Uncertainty in current levels of CoPC in backyard vegetables** - There are limited data available on current levels of CoPC in backyard vegetables and the data are also limited in terms of location.

Based on these limitations, the BAHS recommended that:

- Programs be implemented in the GBA to determine representative metal concentrations in fish from the Baie des Chaleurs. It was also considered prudent to collect comparable data from shellfish; and
- A program be implemented to determine representative metal concentrations in garden produce across the GBA.

A chemical of potential concern (CoPC) is a compound that is carried forward into a risk assessment based on a screening process that ensures that the CoPCs selected are relevant for the area in question and pose potential risk to, in this case, human health. Various considerations in selecting the CoPCs include community concerns, toxicity of chemicals, levels measured and availability of data. This process ensures that chemicals that are most likely to cause the greatest risk are carried forward in the assessment.

The BAHS considered eight different CoPCs. The findings indicated that the key potential issues in the community were related to the concentrations of certain metals (arsenic, cadmium, lead, thallium, and zinc) in the environment. The assessment determined that lead and cadmium exposures were influenced by industrial activity in the GBA. In contrast, exposure to arsenic, thallium, and zinc was primarily associated with background exposures common to the whole population (*e.g.*, commercial food basket which is food obtained from a local grocery store, markets, etc.).

Therefore, lead and cadmium were carried forward as the CoPCs of local interest for the purpose of this project.

1.2 Objectives

The fundamental objective was to obtain data that accurately reflects the reality of the current situation in the GBA. In order to answer this question with the required scientific reliability, we developed an approach and project design intended to meet stated statistical data quality objectives in the most efficient manner.

In addition, we planned sample collection, handling, and preparation procedures to mimic normal household food preparation practices to ensure that the resulting data reflect lead and cadmium concentrations in vegetables and finfish/bivalve mollusks typically consumed by GBA residents. A quality control protocol was developed and we monitored adherence to the developed procedures.

Results from this project were compared to the data used in the BAHS to validate the assumptions used in that study. Comparisons were also made between sub-areas of the GBA and control samples, where available. Based on the outcome of these comparisons, recommendations were proposed.

The study was conducted in strict confidence and individual homeowner information will not be disclosed without written authorization from NBDH.

1.3 Study Area

The study area for Project A (Figure 1.1) encompassed that described in the BAHS (May, 2005), notably: the villages of Belledune (BD), Pointe-Verte (PV) and Petit-Rocher (PR) also known as the Greater Belledune Area (GBA). In light of the findings from the BAHS, the areas denoted as Townsite #2 (TS) and Lower Belledune (LBD), within Belledune, were also sampled as discrete areas. Focus was placed on these two areas as results of the BAHS indicated that residents in LBD were the highest exposed individuals followed by TS, with children and toddlers at potentially higher risks.

In addition, control samples were collected for Project A in order to compare to GBA results obtained from this study. The control region selected was southwestern New Brunswick, primarily the Fredericton area. Produce was purchased from a variety of outlets for locally grown produce. As it was not possible to collect controls for every produce type in the study, controls from the Fredericton region were selected according to which produce the majority of residents indicated they harvested in their gardens. Fredericton was selected for the control region as it is a non-industrialized area relatively free of industrial pollution sources.

To help evaluate the soil results from this study, background reference concentrations for northern New Brunswick were obtained from a background soil data set compiled by the New Brunswick Department of Agriculture and Rural Development (NBDARD) in 1997 and 1998 (Loro, 1997, 1998). This province-wide sampling program (233 samples) established background soil metal concentrations for New Brunswick. The sampling protocol, sample preparation techniques, and analytical methods were similar to those used in this study and, therefore, the results can be reliably compared. For the purposes of this study, we selected only those samples that were collected from northern New Brunswick (49 samples) (Figure 1.2). Refer to Appendix H for a description of the Northern New Brunswick Uplands soil zone.

The study area for Project B included the portion of the Baie des Chaleurs immediately surrounding the GBA, including near-shore waters off Belledune, Pointe-Verte, and Petit-Rocher. Freshwater fish were also caught in the Belledune River, the Elmtree River and the Little Elmtree River. These rivers were selected for sampling based on information received through public consultation.

1.3.1 Project A – Metal Concentrations in Backyard Produce

Identification of garden owners and obtaining their permission to conduct sampling on their property was paramount to the development of the study design. Also, the identification of what produce is grown in these gardens determined which produce was carried forward into the sampling process; which produce was purchased in the control region; and the sample size.

1.3.1.1 Selection of Sampling Sites and Produce to Be Sampled

Selection of Sampling Sites - From the public consultation process (Section 2.0), we identified where the gardens were located geographically and grouped them into the sub-areas of the GBA, namely: Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR).

Selection of Produce to Be Sampled - An inventory of what the local residents were growing in their respective gardens during the sampling period (*i.e.*, July/August, 2005) determined which vegetables were sampled in order to obtain a representative sample of what was grown in each garden. The vegetables purchased in the control region duplicated those sampled in the GBA.

The categories of produce sampled include:

- aboveground exposed vegetables (AE), such as: beans, swiss chard, artichoke, herbs, snow peas, peppers, lettuce, cabbage, spinach, cauliflower, broccoli, celery and green onion
- aboveground protected vegetables (AP), such as: cucumbers, sunflowers, melon, peas, pumpkin, corn, squash and zucchini
- belowground vegetables (B), such as: potatoes, beets, onions, carrots, parsnips, radishes, shallots and turnips
- fruit (F), such as: tomatoes, raspberries, strawberries, plums, apples, grapes, rhubarb, gooseberries, currants, blueberries, pears, cherries, crabapples and watermelons

1.3.1.2 Sample Size

The objective of this project was to obtain statistically defensible results within each sub-area of the GBA. An appropriate number of samples were collected following an appropriate sampling approach.

For this project, it was desirable to achieve a high degree of confidence in the mean for any given area. This was expressed by the 95% upper confidence limit for the mean (95%UCLM). The width of the confidence interval about the mean depends primarily on two factors: the underlying population variance and the number of samples collected from the population.

Based on our knowledge of the GBA, we projected that the required sampling density in each sub-area would be similar to the following:

Lower Belledune	15 gardens
Townsite #2	15 gardens
Belledune	10 gardens
Pointe Verte	9 gardens
Petit Rocher	9 gardens

This approach emphasizes areas with known elevated lead and cadmium concentrations, thereby exercising greater statistical control over the confidence in the results. Details of the number of gardens sampled in each sub-area for the study, which exceeded the above estimates, can be found in Section 3.0.

1.3.2 Project B – Metal Concentrations in Finfish and Bivalve Mollusks

The study design for this project required identification of the types of finfish and bivalve mollusks locally fished by residents in the Baie des Chaleurs and consumed in the GBA. In addition, information was obtained from local residents (*via* questionnaires) regarding what proportion of fish consumed is from the Baie des Chaleurs and from which local plants fish are obtained.

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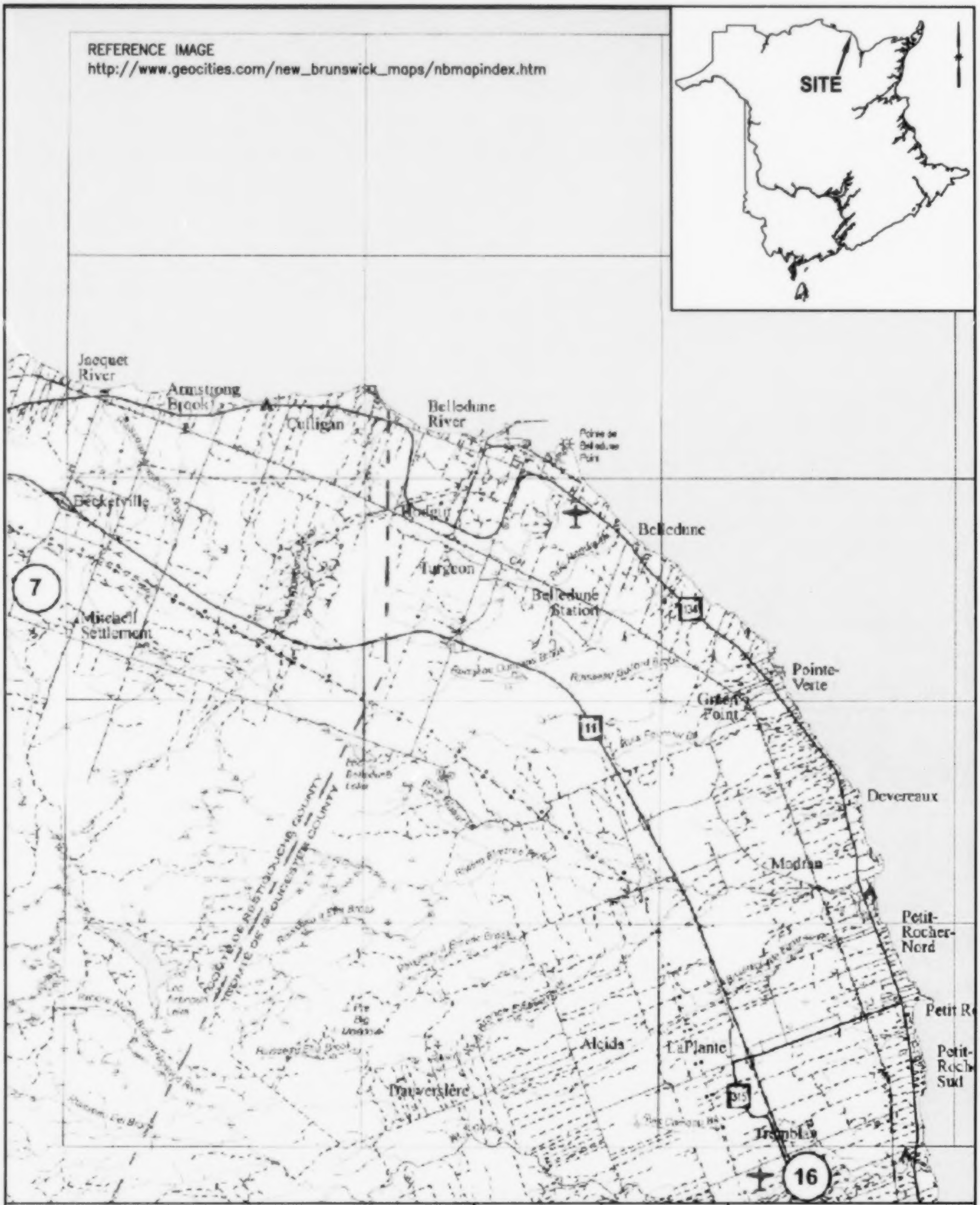
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Armstrong Brook
Culligan
Belledune River
Pointe de Belledune Point
Becketville
Belledune
Turgeon
Belledune Station
7
Mitchell Settlement
134
Pointe-Verte
Green's Point
11
Devereaux
Madran
Petit-Rocher-Nord
Petit R
Petit-Roch Sud
Alcida
LaPlante
Traversière
Tremblay
315
16
COMTÉ DE RESTIGOUCHE COUNTY
COMTÉ DE GLOUCESTER COUNTY

REFERENCE IMAGE
http://www.geocities.com/new_brunswick_maps/nbmapindex.htm

SITE LOCATION MAP
ENVIRONMENTAL SAMPLING STUDY
BELLEDUNE AREA

Date:	Scale:
2006 01 27	N.T.S.
Job No.:	Fig. No.:
1001701	1.1

Jacques Whitford

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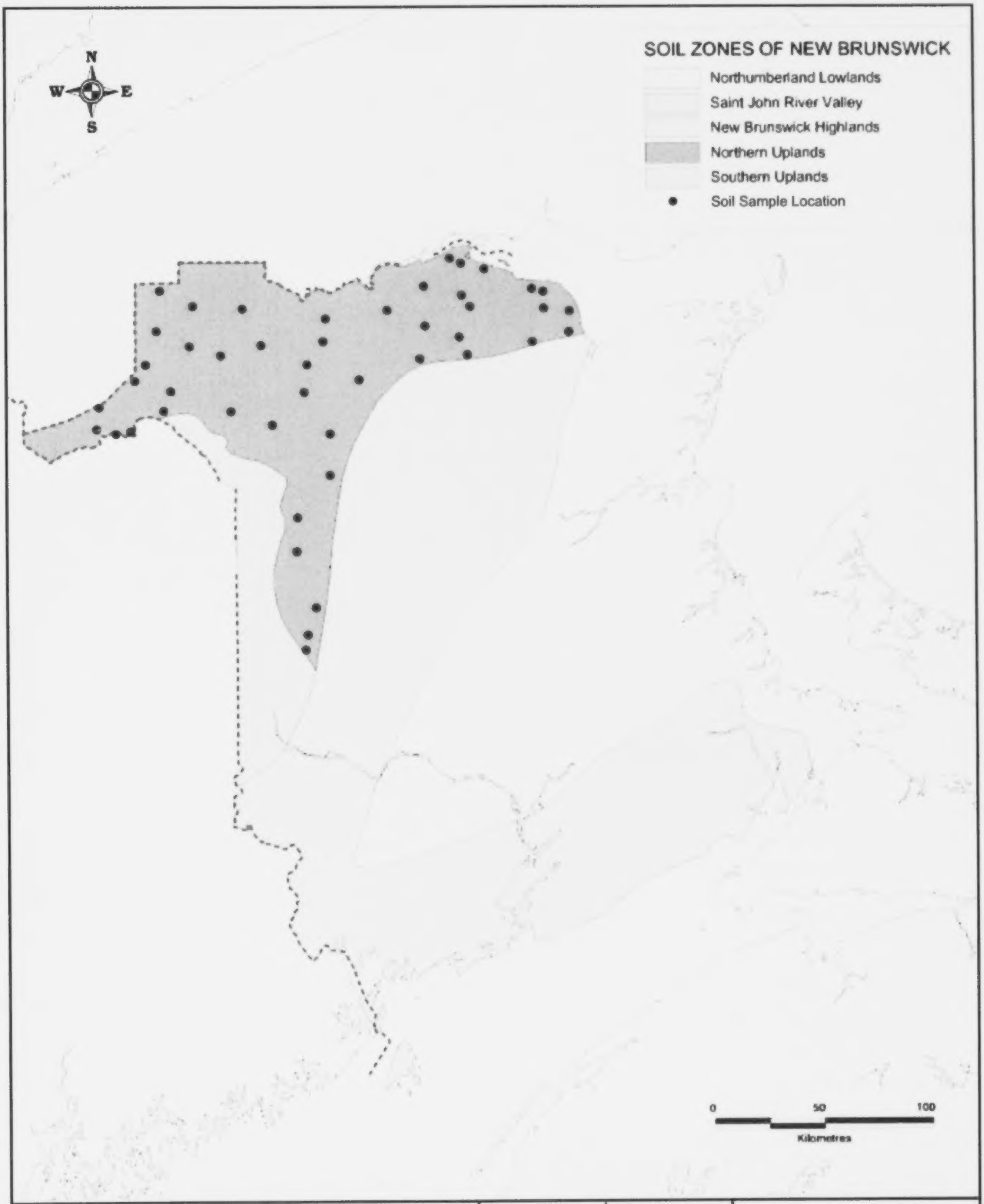
FILE: SOIL


N
W
E
S
SOIL ZONES OF NEW BRUNSWICK
Northumberland Lowlands
Saint John River Valley
New Brunswick Highlands
Northern Uplands
Southern Uplands
Soil Sample Location
0
50
100
Kilometres

SOIL ZONES OF NEW BRUNSWICK
ENVIRONMENTAL SAMPLING STUDY
BELLEDUNE AREA

Date: 2006 01 27

Scale: AS SHOWN

Job No.: 1001701

Fig. No.: 1.2

Jacques Whitford

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1.3.2.1 Selection of Bivalve Mollusks and Finfish to Be Sampled

From the information sessions and the questionnaire we confirmed what species of finfish and bivalve mollusks are fished and consumed in the Baie des Chaleurs surrounding the GBA.

The bivalve mollusk species sampled included blue mussels (*Mytilus edulis*) and soft-shelled clams (*Mya arenaria*) all of which were found in the inter-tidal zone in brackish and marine waters.

Finfish species sampled included Atlantic mackerel (*Scomber scrombrus*), which is a schooling, pelagic fish species and recreationally fished species included trout (*Salvenis* fontinalis).

American Smelt (*Osmerus mordax*) was not sampled due to the timing constraints of this study and the biological behaviour of the species; smelt are typically taken in recreational and commercial fisheries in the Baie des Chaleurs during the winter months. Therefore, frozen samples of locally caught smelt were solicited from residents' freezers *via* the questionnaire and were collected from the residents during the produce sampling phases, provided the provenance of these fish could be reliably established.

1.3.2.2 Selection of Sample Sites and Sample Size

Sampling sites were finalized after consultation with commercial and recreational fishers in the GBA, compiling the information received from the questionnaires and discussions with the project Steering Committee.

River mouths and estuaries were targeted exposure areas as selected species would be present, and where recreational activities (such as fishing or shellfish harvesting) occurred. The following river estuaries were tentatively identified as areas where representative samples could be collected:

- Belledune River (picnic area present), located within Belledune, about 3 km west of the industrial core;
- Hendry Brook, located about 2 km east of the Belledune industrial core;
- Guitard Brook and Fournier Brook at Pointe-Verte (picnic area present); and
- Elmtree River (campground present) at Petit Rocher.

A commercial fisher under the supervision of Jacques Whitford staff was retained to deploy nets and capture commercial and recreational finfish species in the Baie des Chaleurs at BD, LBD, PV and PR. Likewise, Jacques Whitford staff conducted beach and shoreline searches in the Baie de Chaleurs to locate and collect bivalve mollusks as well as fished in the Belledune River, the Elmtree River and the Little Elmtree River.

For sample size, similar approaches were used for the finfish and bivalve mollusks as described for the soils and produce (Section 1.4.1.2) to ensure that defensible and representative samples were collected and analyzed.

2.0 PUBLIC COMMUNICATION PROCESS

It was imperative that communication between the project team and the local residents of the Greater Belledune Area (GBA) be initiated early and be diligently maintained throughout the project. Without their participation, it would have been very difficult to assess the relevant sampling sites *i.e.*, location of gardens and fishing sites. Participation of the local residents was key to the success of this project.

Key information for Project A included: the identification of garden owners and obtaining their permission to conduct sampling on their property; identification of what produce is grown in these gardens; which produce to locate in the control region; and determination of the sample size.

Key requirements for Project B included: the identification of the types of finfish and bivalve mollusks fished in the Baie des Chaleurs and consumed in the GBA; information from local residents regarding what proportion of fish consumed was from the Baie des Chaleurs; whether fish were obtained from local fish plants, and if so, which ones.

The next sections describe the means which Jacques Whitford undertook in order to inform the residents of the GBA that this study was occurring in their area as well as to solicit their participation, namely: media announcements and public notifications, access to a toll free phone number, questionnaires mailed out to all the residents of the GBA, public information sessions, information booth at Belledune Days and door-to-door canvassing.

2.1 Media Announcements and Public Notifications

Jacques Whitford placed an English language advertisement in the Telegraph Journal as well as a French language advertisement in L'Acadie Nouvelle (Appendix B). These ads indicated the date, time and place of information sessions that were to be held in the GBA as well as a brief description of the study and the request for the residents' participation.

Posters, which essentially contained the same information as the newspaper advertisements, were also put up at the Belledune, Pointe-Verte and Petit-Rocher village municipal buildings in order to reach residents who may not have access to the newspapers (Appendix B).

The Mayors of Belledune, Pointe-Verte, Petit-Rocher, Nigadoo, Berresford and Bathurst were notified of the study as well as the information sessions by telephone and were sent the posters via email. They were all invited to attend the information sessions and were given the opportunity to provide comments regarding the study, the posters, and the information sessions. They were also asked to read the posters during their weekly/monthly council meeting.

2.2 Toll Free Phone Number

A hot line was established in order to give the residents of the GBA the opportunity to contact a Jacques Whitford representative free of charge. Residents were encouraged to call the hotline if they had any information to provide for the study or had questions regarding the study. The hotline number was 1-888-867-8122.

2.3 Questionnaire

Prior to the information sessions, 4,131 bilingual questionnaires (Appendix B) were mailed to all residents of the GBA which included: Belledune, Pointe-Verte, Petit-Rocher and the Local Service Districts of Madran, Petit-Rocher Nord, Petit-Rocher Sud, Tremblay, Laplante, Alcida, and Dauversière. The questionnaire was Jacques Whitford's means to solicit participation from the residents of the GBA by asking them to fill out the questionnaire and to return it to us either at the information sessions, by dropping it off at the village municipal building or by mailing it to us using a pre-addressed and pre-paid envelope.

The information solicited by the questionnaire for Project A included: whether a garden existed and could be sampled, the size of the garden and what was being harvested. The information gathered from these questionnaires, allowed for the selection of sampling sites i.e., which gardens would be sampled as well as the determination of whether or not statistical quality objectives had been met *i.e*, if the number of gardens solicited was enough to obtain relevant statistical analysis of the results as stated in the study design.

A total of 50 gardens were acquired from returned questionnaires. As this number did not meet the projected number of gardens required as per the study design, Jacques Whitford conducted door-to-door canvassing in order to solicit more gardens; this process is described in Section 2.5.

The information solicited by the questionnaire for Project B included: whether finfish/bivalve mollusks were being eaten, what kinds, how often, where they were obtained and if fish was caught locally. From the questionnaires that were returned, Jacques Whitford received enough information which allowed for the selection of sampling sites as well as the determination of which types of finfish and bivalve mollusks would be sampled. Therefore no further actions were required to obtain more information.

A total of 100 questionnaires were returned from the residents of the GBA. Other means were used to solicit public participation, as noted in the following paragraphs.

2.4 Public Information Sessions and Belledune Days Information Booth

Two information sessions were held in the GBA at the beginning of the study in order to notify and inform the local residents about the study and to clarify the goals of the study. The first information session was held in English on July 19, 2005 at the Belledune community centre in Belledune from 4-8 pm. Approximately 40 people attended the information session, including local media representatives. The second information session was held in French the following night, July 20, 2005 at the Complexe Madisco in Petit-Rocher, also from 4-8 pm. Approximately 20 people attended the information session including local media representatives.

During the information sessions, volunteers interested in participating in the study were asked to come forward and provide as much information as possible to help with the study design. Three Jacques Whitford representatives were present at each of the information sessions to answer any questions the residents had regarding the study. Poster boards (Appendix B) were available for the residents to consult and to familiarize themselves with the scope of the study. Questionnaires as well as pre-addressed and pre-paid envelopes were also available. A record of comments brought forward during the information sessions can be found in Appendix C.

Based on feedback received at the information sessions, Jacques Whitford set up an information booth at the Belledune Days fair (Saturday, July 30th, 2005). This provided another means to advertise the study to the residents of the GBA as well as solicit more volunteers and answer any questions that arose. Posters (Appendix B) were again put up at the Belledune, Pointe-Verte and Petit-Rocher village municipal buildings indicating that Jacques Whitford would have an information booth during this event as well as a brief description of the study and the request for the residents' participation.

2.5 Door-to-Door Canvassing

Since the number of gardens solicited by the above methods was lower than projected requirements, especially in the Lower Belledune, Townsite #2 and Pointe-Verte areas, door-to-door canvassing was conducted.

Door-to-door canvassing took place concurrently with the first sampling phase, between August 9-12, 2005, where 5 additional gardens were solicited from Pointe-Verte, 10 from Lower Belledune and 8 from Townsite #2.

A number of gardens were added to the list during the sampling phases. The sampling technicians would be collecting samples from a solicited garden when neighbours inquired about the nature of the study. Once informed, many residents then decided to participate in the study and either fill in the questionnaire or simply volunteer their garden for sampling.

A total of 23 gardens were solicited from the residents of the GBA by this method.

2.6 Public Notification of Sampling Phases and Consent Forms

Prior to the beginning of the sampling phases, all residents that had volunteered to have their garden or soil sampled or had locally caught fish in their freezer were contacted by telephone to notify them that the sampling had begun and to schedule a suitable sampling time. Many residents indicated that the sampling technicians could sample their properties even if they were not home at the time.

If the residents were home when the sampling technicians arrived for sampling, they were asked to fill out a consent form (Appendix B) which gave Jacques Whitford permission to sample their property as well as have their samples analyzed for lead and cadmium content. If the residents were not home, the form was left in the door and picked up at a later time.

3.0 SOIL AND PRODUCE

Jacques Whitford conducted two separate sampling phases in order to collect all the soil and produce samples that had been solicited. The first sampling phase occurred August 9-12, 2005 and the second phase occurred August 31-September 1, 2005. There was a need for a second phase of sampling as some produce were not ready to be harvested during the first sampling phase and questionnaires were received after the first sampling phase was completed.

In total, 74 gardens were sampled (7 were soil only sites) where:

- 15 were in Belledune
- 16 were in Lower Belledune
- 15 were in Townsite #2
- 15 were in Pointe-Verte
- 13 were in Petit-Rocher.

As some residents have stopped growing gardens due to concerns of elevated metal concentrations in the soil, there were some properties (7) where only soil was collected from the area where a garden used to be grown. In addition, some residents had multiple garden sites on the same property whereby soil samples were collected from each. A total of 98 soil samples were collected which exceeded the projected required sampling density for each sub-area of the GBA.

Table 3.1 indicates what was sampled from each garden in each sub-area of the GBA. Figure A.1 (Appendix A) shows the approximate location of the gardens that were sampled.

Table 3.1: List of Sampling Areas, Type and Number of Produce Sampled from Each Area

Summary of Vegetable Types	Area					
	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher	Sum
Aboveground Exposed						
beans	15	7	10	10	11	53
swiss chard	2		2			4
herbs	2	1	1	3	2	9
snow peas		1				1
peppers		2	1	3	4	10
lettuce	4	1		7	3	15
cabbage	2	2		1	1	6
spinach	1			3		4
cauliflower				1		1
broccoli		2		1		3
celery		1				1
artichoke			1			1
green onion	1					1
Sub-total	27	17	15	29	21	109

Table 3.1: **List of Sampling Areas, Type and Number of Produce Sampled from Each Area**

Summary of Vegetable Types	Area					
	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher	Sum
Aboveground Protected						
cucumbers	10	3	6	13	12	44
sunflowers		1				1
peas	5	3	2	3	5	18
pumpkin	3				1	4
corn	2	3	1	1	4	11
squash	2	1	1	1	2	7
zucchini	3		2	1		6
wheat					1	1
Sub-total	25	11	12	19	25	92
Belowground						
potatoes	5	1	6	9	8	29
beets	7	2	5	3	9	26
onions	4	5	8	7	10	34
carrots	7	3	4	5	9	28
parsnips		1				1
radish	1		1	1	1	4
turnip	1	3	1	1	4	10
shallots				1	1	2
Sub-total	25	15	25	27	42	134
Fruits						
tomatoes	9	7	8	12	10	46
raspberries	4	2	5	2	5	18
strawberries	1	2	3		1	7
plums				1		1
apples	1	3	1	1	1	7
grapes	1		1	1	1	4
rhubarb	4	4	5		3	16
gooseberries	1		2			3
currants	1					1
blueberries				1	1	2
pear				1		1
cherries	1					1
crabapple	1		2			3
watermelon				1		1
Sub-total	24	18	27	20	22	111
Sum	101	61	79	95	110	
					Total	**446**

As it was not possible to collect controls for every produce type in the study, controls from the Fredericton region were selected according to which produce the majority of residents indicated they harvested in their gardens. Fredericton was selected for the control region as it is a non-industrialized area relatively free of industrial pollution sources. Control samples were collected for the most commonly grown produce types within each category. On average, 21 controls were sampled for each produce category, with approximately 5 samples for each produce type. Table 3.2 indicates the percentage of study samples for which controls were selected as well as the number of control samples collected.

Table 3.2: Summary of Control Samples Collected for Each Produce Category and Produce Type.

Aboveground Exposed	Reference Samples	Aboveground Protected	Reference Samples
beans	5	cucumbers	5
swiss chard	1		
peppers	5	peas	5
lettuce	5		
spinach	2	corn	5
		squash	5
Sub-total	18	**Sub-total**	20

Belowground	Reference Samples	Fruits	Reference Samples
potatoes	5	tomatoes	5
beets	5	raspberries	4
onions	4	strawberries	5
carrots	5	apples	4
turnips	5		
radish	4		
Sub-total	28	**Sub-total**	18
		Total sum	**84**
		Percentage of study samples with controls	**84.1%**

3.1 Sampling Protocol

Field work was carried out in accordance with Jacques Whitford standard operating practices. In order to avoid cross-contamination, the sampling equipment (stainless steel) was decontaminated between each individual specimen. Sampling equipment was scrubbed with a brush and washed in a bucket of soapy potable water. Equipment was then sprayed with methyl hydrate and rinsed in a bucket of distilled water.

Field duplicates were carried out on approximately 10% of all soil, vegetable, and fruit samples collected. This consisted of collecting an extra sample in the field and sending it for analysis labeled such that the laboratory cannot identify it as a duplicate.

3.1.1 Produce

For root vegetables, the edible portion of the plant was collected and the sample was placed in standard two-litre plastic bags and labeled appropriately. The non-edible portion of the plant was not collected as it is difficult to extrapolate the metal concentration in vegetables or fruits from other portions (*i.e.* leaves and stems). Vegetable samples were not combined into "whole garden" composite samples and the vegetable types were analyzed individually.

For aboveground vegetables, where the whole plant is consumed (*e.g.*, lettuce), the head was collected. For any larger produce such as squash or cucumbers the entire edible portion was collected and submitted as a bulk sample.

The produce was placed on ice in a cooler and submitted to the testing laboratory within 24 hours of sample collection. The vegetable and fruit samples were scrubbed and washed by the laboratory (Section 3.1.3) in a manner consistent with normal household preparation procedures prior to consumption, to ensure reproducibility and control of the cleaning/washing procedure. Removal of loosely adhering soil particles from produce is important to ensure that the laboratory analysis of produce is not compromised by the presence of soil and accurately reflects the cadmium and lead content of the vegetable or fruit itself.

3.1.2 Soil

The following soil sampling protocol was completed at each garden location.

Ten soil specimens were randomly collected and combined to produce one composite soil sample for each garden. The soil specimens were collected at a sample depth of 5 to 20 cm (the root zone) using a stainless steel trowel. Vegetation, if present, was removed from all the soil specimens prior to being placed in bags and/or jars. Once the soil specimens were collected they were composited in the field to produce the appropriate soil sample.

A sampling protocol was developed to ensure that all samples were collected, handled, and transported in an appropriate and consistent manner to preserve the integrity of the sample results. After being collected, all soil samples were placed in coolers and submitted to the testing laboratory within 24 hours of sample collection.

3.1.3 Sample Preparation

Soil samples were air-dried at ~30 °C and sieved at 1mm to remove rocks, gravel and large pieces of vegetative matter. The dried, sieved sample portions were homogenized prior to sub-sampling for analysis.

A variety of initial sample preparation procedures were carried out on the remaining samples (Table 3.3). After decontamination of the various tissue specimens, the samples were homogenized by grating of the fresh sample, grating of a frozen sample portion, chopping with a stainless steel knife, or simple physical blending of soft fruits.

It should be noted that the sample surface decontamination procedures were not based upon removal of 100% of any possible extraneous sources of trace elements but were designed to reasonably simulate how the sample might be handled during the course of careful food preparation prior to consumption. For example, loose dirt was removed with a soft-bristled brush and the sample was rinsed under a stream of running (distilled) water for vegetables/fruits that are not normally peeled.

Similarly, the analytical samples consisted of the portions of the food product that are normally consumed. For example, a watermelon sample would not include the skin/rind and corn would include only the kernels but an apple would be homogenized with skin-on. Potato flesh and (scrubbed) peel were prepared and analyzed separately.

Table 3.3: Initial Sample Preparation Procedures for Produce Samples.

Produce	Sample Preparation
turnips	peeled
cauliflower	no greens, rinse
peppers	no seeds, ends off, rinse
Indian wheat	isolate seed head, no greens, rinse
potato	scrubbed and washed, peeled, analyze peel and insides
cucumber	skin on, seeds, rinse
beets	no greens, ends off, peeled
squash	peeled, analyze insides without seeds
carrots	scrubbed and washed, ends off, peel on
onions	ends off, peeled
shallot	ends off, keep 75% green, rinse
peas	keep in pod, if loose then as is, rinse
radish	scrubbed and washed, ends off, no greens
corn	kernels only, rinse
watermelon	insides only without seeds
pears	peel on, no seeds, rinse
swiss chard	treat as spinach or lettuce, as is, rinse
grapes	seeds in, rinse
apples	peel on, no seeds, rinse
zucchini	ends off, peel on, rinse
lettuce	as is, rinse
beans	ends off, rinse
tomato	ends off, rinse
rhubarb	as is, rinse
cabbage	as is, rinse
blueberries	as is, rinse
gooseberries	as is, rinse
strawberries	as is, rinse
raspberries	as is, rinse
cherries	as is, rinse
herbs	as is, rinse
broccoli	as is, rinse

Soil samples were digested with nitric acid and hydrogen peroxide according to USEPA Method 3050B. Sub-samples (0.500 ± 0.005 g) were weighed into graduated screw-cap polypropylene digestion tubes. Heating was carried out in a Teflon coated graphite hot-block digestor.

Portions (~2-4 g) of tissue samples were accurately weighed into graduated screw-cap polypropylene digestion tubes. Digestion with high-purity nitric acid was carried out in a Teflon coated graphite hot-block digestor.

Samples were diluted to volume (50 mL for soils and 40 mL for tissues) in the digestion vessels.

3.1.4 Laboratory Analysis

Tissue digest samples (produce) were analyzed without further dilution using a Thermo X-7 ICP-MS instrument. Although the actual detection limit is a function of the sample weight used, reporting limits of 0.02 ng/g for cadmium and 0.1 ng/g for lead were achieved. All results for vegetation samples were reported on an "as received" (wet weight) basis in ng/g (ppb).

Soil samples were diluted a further 10x and were analyzed for lead and cadmium using a VG PlasmaQuad II Inductively Coupled Plasma Mass Spectrometer (ICP-MS). Lead and cadmium results for soil samples were reported in mg/kg (ppm) on a dry weight basis. The reporting limit for cadmium was 0.05 mg/kg and the reporting limit for lead was 0.5 mg/kg.

3.1.5 Quality Assurance/Quality Control (QA/QC)

QA/QC samples were prepared and analyzed concurrently with the samples. For the laboratory fortified (spiked) samples, a standard solution containing the target elements was added to a weighed sub-sample of the homogenate prior to digestion and analysis.

Reagent Blanks - Results for the majority of the reagent blanks were close to, or below the reporting limits established for this analytical series. In essentially all cases, reagent blank levels were substantially lower than trace element concentrations detected in the samples. Reagent blank concentrations were calculated on the basis of the average sample weight/volume used for the analytical specimens. Sample results were not corrected for reagent blanks as it would have had no effect on the outcome of the results.

"Spiked" Samples - Calculated analytical spike recoveries for both lead and cadmium ranged from ~75-116% in vegetation samples. Spikes were not carried out for soil samples. Some of the variability in spike recovery data may have been due to variability in the "base" element concentration in the original specimen (separate sample portions were spiked prior to sample digestion). All spike levels were 12.5 µg/L (for the final solution concentration).

Duplicates - Reproducibility of analytical replicates is a function of variances in digestion recovery and instrument response in addition to factors relating to the homogeneity of the samples. It was noted, for example, that there seemed to be higher variability (for lead, in particular) for vegetation samples that had exposed outer layers that can trap dirt. Better reproducibility was observed for peeled or smooth-skinned samples. As expected, reproducibility was somewhat poorer for element concentrations approaching the method detection limit.

Reference Materials - A number of different reference materials were prepared and analyzed concurrently with the samples. NIST 1575 (Pine Needles) was run with all of the vegetation samples. This material is not certified for cadmium but literature values are consistent with the data reported. Lead results were in good agreement. NIST 2709 and NIST 2711 were analyzed with the soil samples with results in good agreement with published data for EPA 3050 extraction.

3.2 Results

The soil and produce results have been treated separately for ease of comprehension.

For soil, initial comparisons are made between the sub-areas of the GBA as well as the NB background reference data using analysis of variance (ANOVA) to determine whether sub-areas were statistically different from each other (refer to Appendix G for a description of ANOVA). The soil results were then compared to the exposure point concentrations (EPCs) presented in the BAHS.

The soil EPCs presented in the BAHS for cadmium (Table 3.4) and lead (Table 3.5), which are used to compare the soil results from this study, are understood to have been developed for soil based on both Noranda and Conservation Council of New Brunswick (CCNB) data. In general, mean values were adopted as the best estimate EPCs in each sub-area of the GBA. Upper bound EPCs generally adopted the Upper Confidence Limit (UCL) of the mean.

The JW 2005 mean values are the geometric means of the data. The geometric mean was used as the results from this study followed a lognormal distribution.

Table 3.4: Soil Cadmium EPCs Presented in the BAHS That Were Used to Compare Soil Cadmium Concentration Results.

CADMIUM SOIL (mg/kg) dry weight	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	0.72	0.94	0.84	1.51	1.01	0.69
TS	2.2	3.5	1.47	1.75	1.91	1.13
LBD	1.8	5.1	1.92	1.83	2.54	1.45
PV	0.64	0.82	0.81	1.54	1.00	0.66
PR	0.29	0.48	0.66	1.41	0.79	0.56

Table 3.5: Soil Lead EPCs Presented in the BAHS That Were Used to Compare Soil Lead Concentration Results.

LEAD SOIL (mg/kg) dry weight	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	49	67	61.80	1.61	76.74	49.77
TS	130	230	108.14	2.28	159.22	73.62
LBD	120	330	138.36	1.61	172.98	110.66
PV	45	60	50.82	1.58	62.81	41.02
PR	24	39	48.08	1.56	60.53	38.19

For produce, initial comparisons were made between the sub-areas of the GBA using analysis of variance (ANOVA) to determine whether sub-areas were statistically different from each other (refer to Appendix G for a description of ANOVA) and then the produce results were compared to the EPCs presented in the BAHS. Since potato peels and potato flesh were analyzed separately, we have also presented a comparison between the peel and the flesh for cadmium and lead concentrations.

The garden vegetables EPCs presented in the BAHS for cadmium (Table 3.6) and lead (Table 3.7), which are used to compare the produce results from this study, are understood to have been developed based on the summary of monitoring measurements collected from the Noranda Environmental Monitoring Program (EMP). The mean of all measured concentrations was used as the best estimate EPCs. For BD, PV and PR, the upper bound EPC was set equal to the UCLM and for TS and LBD, the maximum measured concentration for an individual measurement was used as the upper bound EPC.

Limitations resulted in the produce comparisons as the BAHS presented EPCs for root vegetable and other vegetables only. In this study, the produce have been categorized into aboveground exposed, aboveground protected, belowground, and fruit. Therefore, belowground produce results have been compared to root vegetables EPCs from the BAHS while the aboveground exposed, aboveground protected, and fruit results have been compared to other vegetable EPCs from the BAHS.

Table 3.6: Root and Other Vegetables Cadmium EPCs Presented in the BAHS That Were Used to Compare Produce Cadmium Concentration Results.

CADMIUM Below Ground Vegetable

Root Vegetables (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	100	130	39.90	2.52	58.48	27.28
TS	78	83	48.53	3.24	92.90	25.29
LBD	170	180	63.10	2.13	86.30	46.24
PV	68	88	27.10	2.07	36.14	20.32
PR	68	88	36.14	2.08	45.50	28.77

CADMIUM Above Ground Exposed Vegetable

Other vegetables (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	58	81	10.62	8.91	25.24	4.48
TS	91	340	11.56	5.46	27.61	4.83
LBD	23	40	11.86	5.86	31.62	4.46
PV	40	130	23.99	10.42	58.48	9.84
PR	40	130	6.81	7.64	17.18	2.70

CADMIUM Above Ground Protected Vegetable

Other vegetables (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	58	81	3.52	2.64	5.26	2.36
TS	91	340	7.38	3.24	16.26	3.35
LBD	23	40	9.27	2.09	14.79	5.81
PV	40	130	4.13	2.10	5.90	2.89
PR	40	130	4.23	1.83	5.43	3.30

Table 3.6: **Root and Other Vegetables Cadmium EPCs Presented in the BAHS That Were Used to Compare Produce Cadmium Concentration Results.**

CADMIUM Fruits

Other vegetables (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	58	81	9.35	3.85	16.52	5.30
TS	91	340	22.91	3.47	42.56	12.36
LBD	23	40	16.22	4.05	28.18	9.31
PV	40	130	9.18	3.54	16.60	5.09
PR	40	130	8.02	2.54	12.13	5.30

Table 3.7: **Root and Other Vegetables Lead EPCs Presented in the BAHS That Were Used to Compare Produce Lead Concentration Results.**

LEAD Below Ground Vegetable

Root Vegetables (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	340	420	9.42	2.37	13.43	6.59
TS	350	500	17.22	4.99	41.98	7.06
LBD	420	500	20.70	3.16	33.27	12.88
PV	300	560	7.03	2.80	10.57	4.68
PR	300	560	7.85	2.94	10.99	5.61

LEAD Above Ground Exposed Vegetable

Other vegetables (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	820	1200	12.85	4.75	23.77	6.93
TS	1700	6300	8.87	5.78	21.88	3.61
LBD	540	900	21.38	5.35	54.20	8.45
PV	1200	2800	17.50	5.55	33.57	9.12
PR	1200	2800	5.66	3.79	10.40	3.09

LEAD Above Ground Protected Vegetable

Other vegetables (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	820	1200	2.83	2.03	3.78	2.11
TS	1700	6300	5.25	2.40	9.44	2.92
LBD	540	900	7.59	2.64	14.06	4.09
PV	1200	2800	3.29	2.00	4.6	2.36
PR	1200	2800	3.03	2.62	4.51	2.04

Table 3.7: **Root and Other Vegetables Lead EPCs Presented in the BAHS That Were Used to Compare Produce Lead Concentration Results.**

LEAD Fruits						
Other vegetables (ng/g) wet weight						
	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	820	1200	8.36	10.33	22.39	3.12
TS	1700	6300	12.82	11.04	42.36	3.89
LBD	540	900	36.73	10.05	91.41	14.72
PV	1200	2800	3.14	6.15	7.35	1.34
PR	1200	2800	3.66	6.22	8.22	1.63

The box and whisker plots depict the following statistical criteria: the minimum, the first quartile, the median, the third quartile and the maximum. The box connects the quartiles to the mean and whiskers extend from the first quartile down to the minimum and from the third quartile to the maximum. Outliers in the upper or lower part of the distribution are identified asterisks. Extreme outliers in the upper or lower part of the distribution are identified as open circles (refer to Appendix G for a description of box and whisker plots).

In the ANOVA tables, those boxes that remain empty represent sub-areas that are not statistically different from each other. The symbol < should be read as "is lower than". The symbol > should be read as "is higher than".

3.2.1 Soil

The raw data for the soil can be found in Table D.1 (Appendix D).

3.2.1.1 Cadmium

The initial comparison of soil cadmium concentrations between the sub-areas of the GBA and the background reference samples is shown in Figure 3.1 and Table 3.8. ANOVA results for soil cadmium concentrations between the sub-areas of the GBA and the background reference samples are shown in Table 3.9.

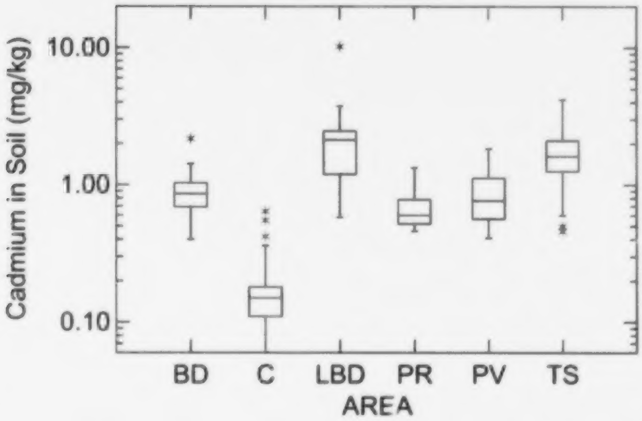

Figure 3.1: **Cadmium Concentrations in Soil for the Sub-areas of the GBA (logarithmic scale); Belledune (BD), Control Samples (C), Lower Belledune (LBD), Petit-Rocher (PR), Pointe-Verte (PV) and Townsite #2 (TS).**

Table 3.8: **Statistical Values for Cadmium Concentrations in Soil Results Represented in Figure 3.1.**

	BD	TS	LBD	PV	PR	C
N of cases	21	20	20	20	17	49
Minimum	0.4	0.46	0.58	0.41	0.46	10.2
Maximum	2.17	4.19	10.2	1.83	1.33	33.4
Median	0.86	1.62	2.12	0.765	0.6	14.5
1st quartile (25%)	0.675	1.26	1.195	0.565	0.517	13
3rd quartile (75%)	1.052	2.105	2.465	1.125	0.785	16.65

Table 3.9: **Analysis of Variance (ANOVA) for Cadmium in Soil Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR); and Control Samples (C).**

Control						
Belledune	BD > C					
Townsite #2	TS > C	TS > BD				
Lower Belledune	LBD > C	LBD > BD				
Pointe-Verte	PV > C		PV < TS	PV < LBD		
Petit-Rocher	PR > C		PR < TS	PR < LBD		
	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher

As indicated, ANOVA results show that soil cadmium concentrations are statistically significantly higher in TS and LBD than BD, PV and PR. LBD soil cadmium concentrations are not statistically different from TS, and BD, PV and PR are not statistically different from each other. Soil cadmium concentrations in all sub-areas of the GBA were higher than the background reference samples.

A statistical comparison of the soil results from this study to the findings in the BAHS was conducted in order to validate the assumptions used in the BAHS. Figure 3.2 shows the results of the soil cadmium concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on these comparisons, the soil cadmium concentrations from BD and PV are not statistically different to the BAHS EPCs for these areas. For TS, the soil cadmium concentrations are lower than both the best estimate and upper bound BAHS EPCs, and for LBD the concentrations are not statistically different from the best estimate EPC but are lower than the upper bound EPC. For PR, the soil cadmium concentrations from this study are higher than the BAHS EPCs.

The significance of these findings indicates that the soil cadmium results from this study are lower than or not statistically different from the EPCs used in the BAHS except for the soil cadmium concentration in PR. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure. It must be noted that although soil cadmium concentrations in PR for this study were determined to be statistically significantly higher than the BAHS best estimate and upper bound EPCs, the difference is marginal as the CCME residential soil quality guideline for cadmium is 10 mg/kg and both results from this study as well as the BAHS EPCs are lower than the CCME guideline.

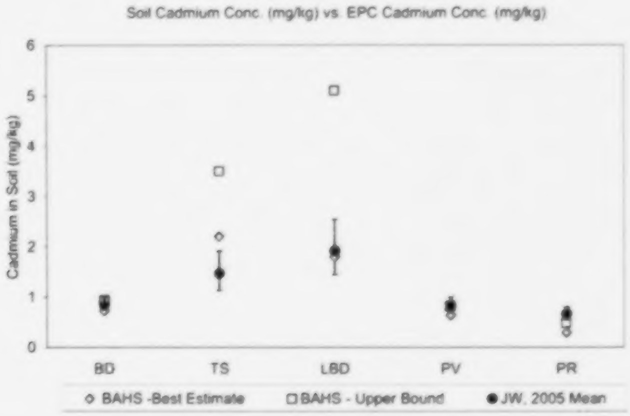

Figure 3.2: **Comparison of Soil Cadmium Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-area of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

3.2.1.2 Lead

The initial comparison of soil lead concentrations between the sub-areas of the GBA and the background reference samples is shown in Figure 3.3 and Table 3.10. ANOVA results for soil lead concentrations between the sub-areas of the GBA and the background reference samples are shown in Table 3.11.

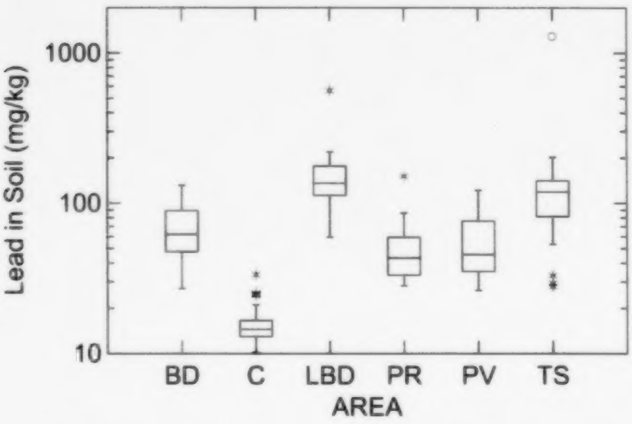

Figure 3.3 **Lead Concentrations in Soil for the Sub-areas of the GBA (logarithmic scale; Belledune (BD), Control Samples (C), Lower Belledune (LBD), Petit-Rocher (PR), Pointe-Verte (PV) and Townsite #2 (TS).**

Table 3.10: **Statistical Values for Lead Concentrations in Soil Results Represented in Figure 3.3.**

	BD	TS	LBD	PV	PR	C
N of cases	21	20	20	20	17	49
Minimum	27	27.9	59.5	26.3	28.2	0.06
Maximum	131	1290	561	122	151	0.64
Median	62	119	135.5	45.55	43.2	0.15
1st quartile (25%)	46.525	81.65	112.5	35.2	33.125	0.11
3rd quartile (75%)	92.4	141	176	76.15	60.8	0.182

As indicated, ANOVA results show that soil lead concentrations are statistically significantly higher in TS and LBD than BD, PV and PR. LBD soil lead concentrations are not statistically different from TS and BD, PV and PR are not statistically different from each other. Soil lead concentrations in all sub-areas of the GBA are higher than the background reference samples.

Table 3.11: **Analysis of Variance (ANOVA) for Lead in Soil Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR); and Control Samples (C).**

Control						
Belledune	BD > C					
Townsite #2	TS > C	TS > BD				
Lower Belledune	LBD > C	LBD > BD				
Pointe-Verte	PV > C		PV < TS	PV < LBD		
Petit-Rocher	PR > C		PR < TS	PR < LBD		
	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher

Figure 3.4 shows the results of the soil lead concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, the soil lead results from this study for BD and PR are statistically significantly higher than the best estimate EPCs presented in the BAHS but not statistically different from the upper bound EPCs. Soil lead results from this study for TS and LBD are not statistically different from the best estimate EPCs presented in the BAHS and lower than the upper bound EPCs. The soil lead results from this study for PV are not statistically different from the best estimate and the upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the soil lead results from this study are lower than or not statistically different from the EPCs used in the BAHS except for the soil lead concentrations in BD and PR. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure. It must be noted that although soil lead concentrations in BD and PR for this study were determined to be statistically significantly higher than the BAHS best estimate EPC, the difference is marginal as the CCME residential soil quality guideline for lead is 140 mg/kg and both results from this study as well as the BAHS EPC are lower than the CCME guideline.

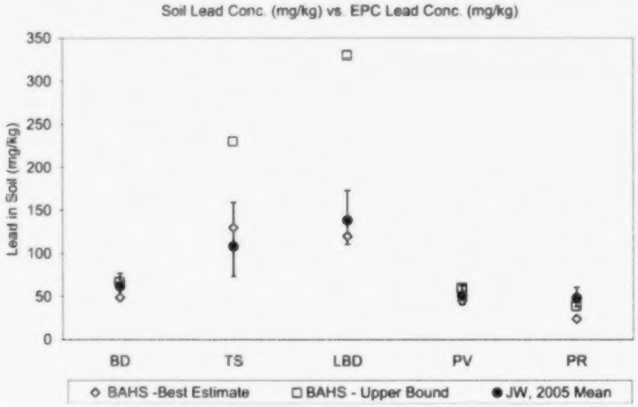

Figure 3.4: **Comparison of Soil Lead Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-area of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

3.2.1.3 Comparison to Regional Background

Figure 3.5 shows the comparison of the soil results from this study to background soil from a similar soil zone (Northern Uplands) in New Brunswick. Background concentrations of cadmium and lead are statistically significantly lower than the soil cadmium and lead concentrations in each sub-area of the GBA. ANOVA results confirmed that cadmium (Table 3.9) and lead (Table 3.11) concentrations from all the sub-areas of the GBA were statistically significantly higher than the background concentrations in soil from the Northern Uplands zone in New Brunswick. Figure 3.5 highlights that the highest soil cadmium and lead concentrations were found in TS and LBD with the other GBA sub-areas closer to background levels.

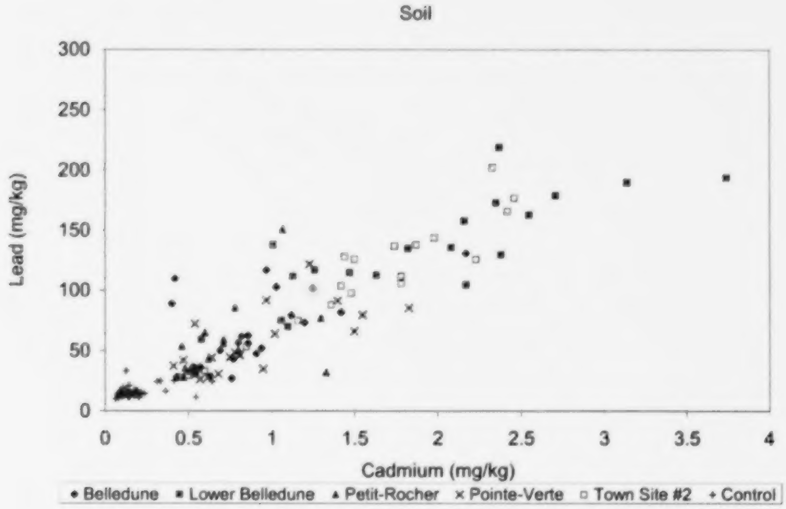

Figure 3.5: **Cadmium and Lead Concentrations in Soil in the GBA Sub-areas Compared to Cadmium and Lead Concentrations in Soil from a Similar Soil Zone (Northern Uplands) in New Brunswick (Control).**

3.2.2 Produce

The raw data for the produce can be found in Table D.2 (Appendix D) (excluding potato) and Table D.3 (Appendix D) (potato peels and flesh only).

3.2.2.1 Cadmium

The initial comparison of cadmium concentrations by produce type for Aboveground Exposed (AE), Aboveground Protected (AP), Belowground (B) and Fruit (F) between the sub-areas of the GBA as well as the control (C) is shown in Figure 3.6 and Table 3.12. ANOVA results for cadmium concentrations between the sub-areas of the GBA are shown in Table 3.13 for Aboveground Exposed, Table 3.14 for Aboveground Protected, Table 3.15 for Belowground and Table 3.16 for Fruit.

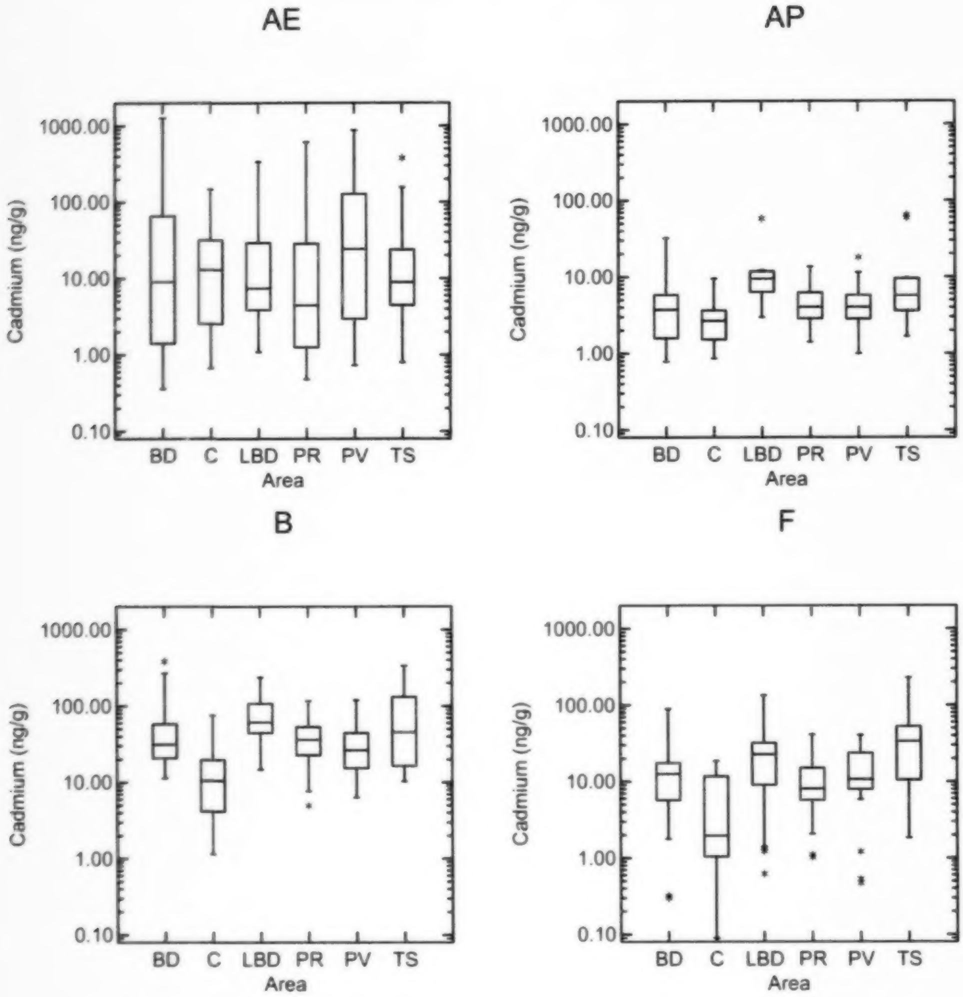

Figure 3.6: Cadmium Concentrations by Produce Type for Aboveground Exposed (AE), Aboveground Protected (AP), Belowground (B) and Fruit (F) in the GBA Sub-areas (logarithmic scale); Belledune (BD), Control (C), Lower Belledune (LBD), Petit-Rocher (PR), Pointe-Verte (PV) and Townsite #2 (TS).

Table 3.12: Statistical Values for Cadmium Concentrations by Produce Type Results Represented in Figure 3.6.

	BD	TS	LBD	PV	PR	C
Aboveground Exposed						
N of cases	27	17	15	29	21	18
Minimum	0.36	0.8	1.09	0.73	0.48	0.67
Maximum	1260	377	338	879	610	148

Table 3.12: Statistical Values for Cadmium Concentrations by Produce Type Results Represented in Figure 3.6.

	BD	TS	LBD	PV	PR	C
Aboveground Exposed						
Median	9.04	8.91	7.44	24.3	4.45	13.05
1st quartile (25%)	1.393	3.985	3.492	2.655	1.21	2.56
3rd quartile (75%)	66.65	25.425	42.425	129.25	31.025	31.8
Aboveground Protected						
N of cases	25	11	12	19	25	20
Minimum	0.78	1.67	2.97	1	1.41	0.86
Maximum	32.1	64.2	57.8	18	13.6	9.52
Median	3.73	5.7	9.43	4.03	4.03	2.66
1st quartile (25%)	1.562	3.573	6.355	2.673	2.778	1.515
3rd quartile (75%)	5.897	9.56	11.8	6.097	6.242	3.685
Belowground						
N of cases	25	15	25	27	42	28
Minimum	11.3	10.3	14.81	6.33	4.96	1.16
Maximum	384	337	237	120	116	75.4
Median	31.4	45.2	61.19	26.3	36.075	10.55
1st quartile (25%)	20.318	16.175	42.247	14.888	22.7	4.165
3rd quartile (75%)	59.058	145.25	108.83	44.875	53.2	19.7
Fruit						
N of cases	24	18	27	20	22	18
Minimum	0.3	1.84	0.62	0.47	1.02	0.09
Maximum	89.5	229	134	40.6	41.1	18.6
Median	12.65	33.6	22.8	10.75	8.04	2.025
1st quartile (25%)	5.72	10.5	8.005	7.995	5.72	1.04
3rd quartile (75%)	17.5	52.5	32.275	23.85	15	11.7

For Aboveground Exposed produce cadmium concentrations (Table 3.13), ANOVA indicates that the sub-areas in the GBA are not statistically different from each other or the control samples.

Table 3.13: Analysis of Variance (ANOVA) for Cadmium in Aboveground Exposed Produce Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV), Petit-Rocher (PR) and Control Samples (C).

	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher
Control						
Belledune						
Townsite #2						
Lower Belledune						
Pointe-Verte						
Petit-Rocher						

For Aboveground Protected produce cadmium concentrations (Table 3.14), ANOVA indicates that TS and LBD are statistically significantly higher than the control. BD, PV and PR are not statistically different from the control samples, and the GBA sub-areas are not statistically different from each other.

Table 3.14: Analysis of Variance (ANOVA) for Cadmium in Aboveground Protected Produce Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV), Petit-Rocher (PR) and Control Samples (C).

	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher
Control						
Belledune						
Townsite #2	TS > C					
Lower Belledune	LBD > C					
Pointe-Verte						
Petit-Rocher						

For Belowground produce cadmium concentrations (Table 3.15), ANOVA indicates that the control samples are statistically significantly lower than BD, TS, LBD, PV and PR and that TS and LBD are statistically significantly higher than PV.

Table 3.15: Analysis of Variance (ANOVA) for Cadmium in Belowground Produce Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV), Petit-Rocher (PR) and Control Samples (C).

	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher
Control						
Belledune	BD > C					
Townsite #2	TS > C					
Lower Belledune	LBD > C					
Pointe-Verte	PV > C		PV < TS	PV < LBD		
Petit-Rocher	PR > C					

For Fruit cadmium concentrations (Table 3.16), ANOVA indicates that the control samples are statistically significantly lower than BD, TS, LBD, PV and PR. The GBA sub-areas are not statistically different from each other.

Table 3.16: Analysis of Variance (ANOVA) for Cadmium in Fruit Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV), Petit-Rocher (PR) and Control Samples (C).

	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher
Control						
Belledune	BD > C					
Townsite #2	TS > C					
Lower Belledune	LBD > C					
Pointe-Verte	PV > C					
Petit-Rocher	PR > C					

A statistical comparison of the produce cadmium concentration results from this study to the EPCs used in the BAHS was conducted in order to validate the assumptions used in the Health Study.

Figure 3.7 shows the results of the Aboveground Exposed produce cadmium concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, AE produce cadmium results from this study for BD, TS and PR are lower than the best estimate EPCs and upper bound EPCs presented in the BAHS. Aboveground Exposed produce cadmium results from this study for LBD are not statistically different from the best estimate and upper bound EPCs presented in the BAHS. For PV, the produce cadmium results from this study are not statistically different from the best estimate EPC but are statistically significantly lower than the upper bound EPC.

The significance of these findings indicates that the Aboveground Exposed produce cadmium results from this study are lower than or not statistically different from the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

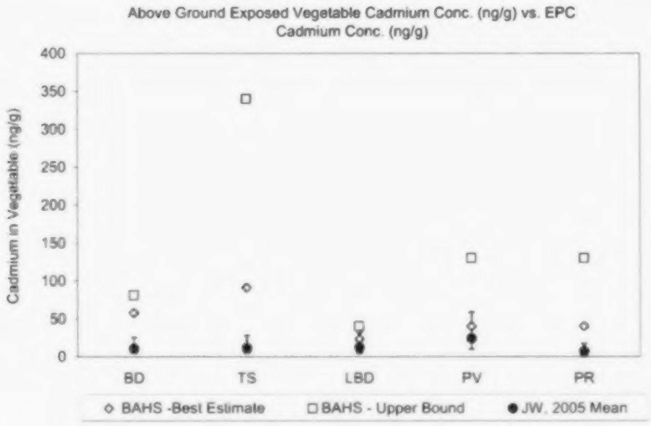

Figure 3.7: **Comparison of Aboveground Exposed Produce Cadmium Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 3.8 shows the results of the Aboveground Protected produce cadmium concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, Aboveground Protected produce cadmium results from this study for all of the sub-areas of the GBA are statistically significantly lower than the best estimate and the upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the Aboveground Protected produce cadmium results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

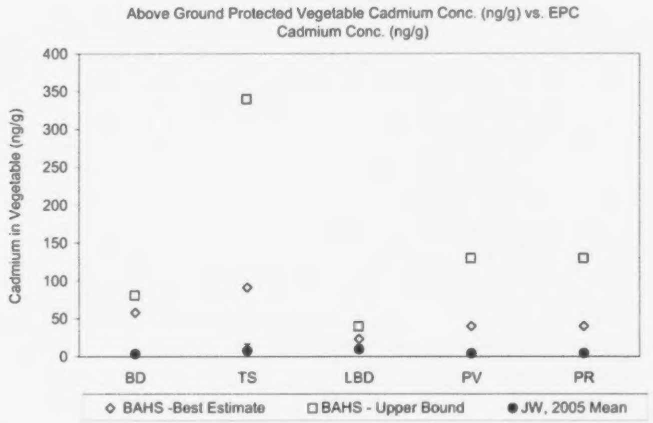

Figure 3.8: **Comparison of Aboveground Protected Produce Cadmium Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 3.9 shows the results of the Belowground produce cadmium concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, Belowground produce cadmium results from this study for BD, LBD, PV and PR are lower than the best estimate EPCs and upper bound EPCs presented in the BAHS. Belowground produce cadmium results from this study for TS are not statistically different from the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the Belowground produce cadmium results from this study are lower than or not statistically different from the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

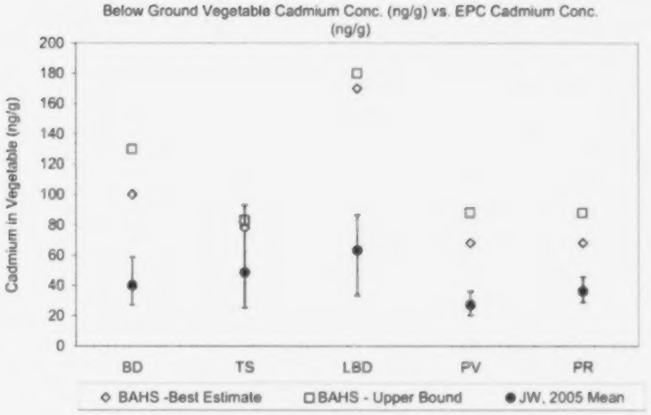

Figure 3.9: **Comparison of Belowground Produce Cadmium Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 3.10 shows the results of the Fruit cadmium concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, Fruit cadmium results from this study for BD, TS, PV and PR are lower than the best estimate EPCs and upper bound EPCs presented in the BAHS. The Fruit cadmium results from this study for LBD are not statistically different from the best estimate EPCs presented in the BAHS and are lower than the upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the Fruit cadmium results from this study are lower than or not statistically different from the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

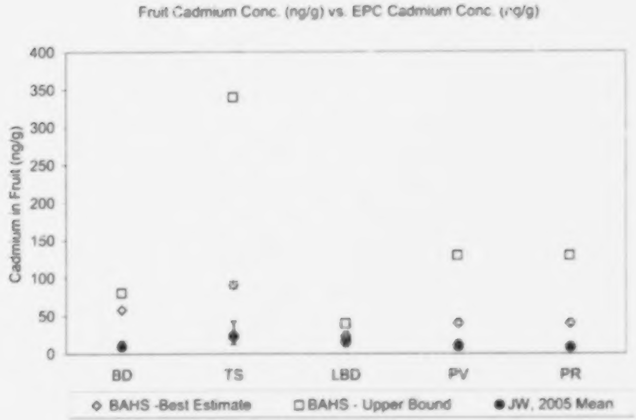

Figure 3.10: **Comparison of Fruit Cadmium Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

To evaluate the distribution of cadmium in belowground produce, potato samples were peeled and the peel was analyzed separately from the flesh. Figure 3.11 shows the cadmium concentration in the potato peel compared to the cadmium concentration in the potato flesh. The slope that appears on the graph is that of a one-to-one ratio; this was used to indicate that the cadmium levels in the potato peel are higher than the cadmium levels in the potato flesh.

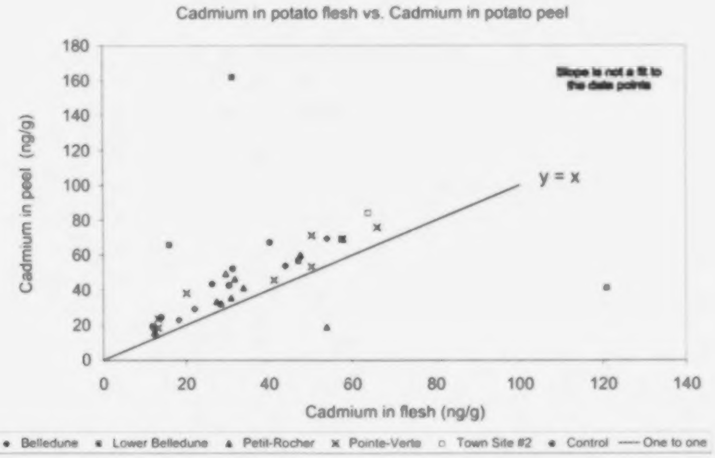

Figure 3.11: **Cadmium Concentrations in Potato Peel and Potato Flesh from the Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Petit-Rocher (PR), Pointe-Verte (PV), Townsite #2 and Control (C).**

3.2.2.2 Lead

The initial comparison of lead concentrations by produce type for Aboveground Exposed (AE), Aboveground Protected (AP), Belowground (B) and Fruit (F) between the sub-areas of the GBA as well as the control (C) is shown in Figure 3.12 and Table 3.17. The results of the analysis of Variance (ANOVA) for lead concentrations between the sub-areas of the GBA are shown in Table 3.18 for Aboveground Exposed, Table 3.19 for Aboveground Protected, Table 3.20 for Belowground and Table 3.21 for Fruit.

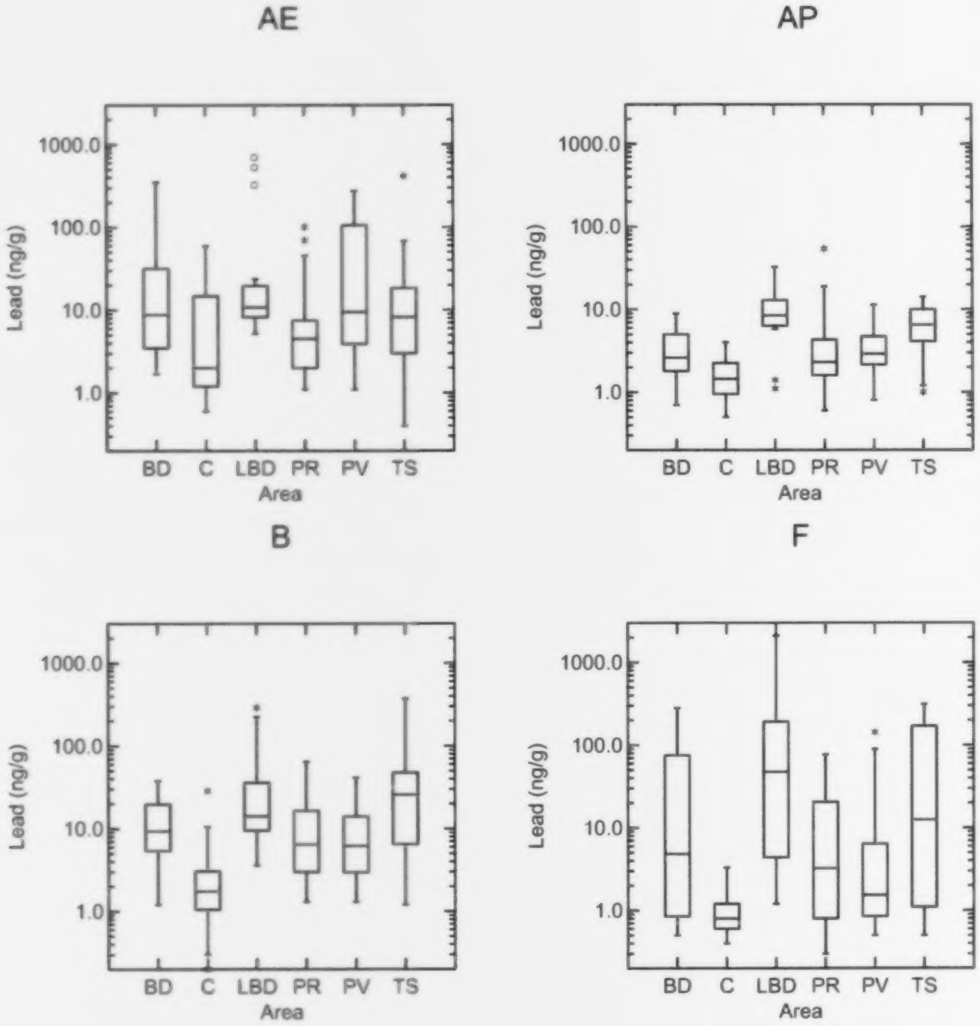

Figure 3.12: **Lead Concentrations by Produce Type for Aboveground Exposed (AE), Aboveground Protected (AP), Belowground (B) and Fruit (F) in the GBA Sub-areas (logarithmic scale); Belledune (BD), Control (C), Lower Belledune (LBD), Petit-Rocher (PR), Pointe-Verte (PV) and Townsite #2 (TS).**

Table 3.17: Statistical Values for Lead Concentrations by Produce Type Results Represented in Figure 3.12.

	BD	TS	LBD	PV	PR	C
Aboveground Exposed						
N of cases	27	17	15	29	21	18
Minimum	1.7	0.4	5.2	1.1	1.1	0.6
Maximum	349	416	699	275	101	59.4
Median	8.8	8.2	10.8	9.5	4.5	2.05
1st quartile (25%)	3.45	2.95	8.225	3.875	1.95	1.2
3rd quartile (75%)	32.45	21.2	21.85	107.75	8.6	14.8
Aboveground Protected						
N of cases	25	11	12	19	25	20
Minimum	0.7	1	1.1	0.8	0.6	0.5
Maximum	8.9	14.1	32.5	11.4	53.9	4
Median	2.6	6.5	8.5	2.9	2.3	1.45
1st quartile (25%)	1.775	3.875	6.35	2.075	1.6	0.95
3rd quartile (75%)	5.2	10.25	12.95	4.75	4.325	2.25
Belowground						
N of cases	25	15	25	27	42	28
Minimum	1.2	1.2	3.6	1.3	1.3	0.2
Maximum	37.8	373	291	41.3	64.5	28.7
Median	9.3	25.8	14.1	6.2	6.45	1.75
1st quartile (25%)	5.35	6.35	9.475	2.75	3	1.05
3rd quartile (75%)	20.625	54.35	38.025	14.075	16.5	3.05
Fruit						
N of cases	24	18	27	20	22	18
Minimum	0.5	0.5	1.2	0.5	0.3	0.4
Maximum	280	314	2100	143	77.2	3.3
Median	5.3	12.55	47.3	1.55	3.3	0.8
1st quartile (25%)	0.85	1.1	4.075	0.85	0.8	0.6
3rd quartile (75%)	75.4	170	207.25	6.5	20.5	1.2

For Aboveground Exposed produce lead concentrations (Table 3.18), ANOVA indicates that LBD and PV are statistically significantly higher than the control. BD, TS and PR are not statistically different from the control samples and the five sub-areas of the GBA are not statistically different from each other.

Table 3.18: Analysis of Variance (ANOVA) for Lead in Aboveground Exposed Produce Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV), Petit-Rocher (PR) and Control Samples (C).

	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher
Control						
Belledune						
Townsite #2						
Lower Belledune	LBD > C					
Pointe-Verte	PV > C					
Petit-Rocher						

For Aboveground Protected produce lead concentrations (Table 3.19), ANOVA indicates that the control samples are statistically significantly lower than all sub-areas of the GBA. LBD is statistically significantly higher than BD but statistically significantly lower than PV and PR.

Table 3.19: **Analysis of Variance (ANOVA) for Lead in Aboveground Protected Produce Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV), Petit-Rocher (PR) and Control Samples (C).**

Control						
Belledune	BD > C					
Townsite #2	TS > C					
Lower Belledune	LBD > C	LBD > BD				
Pointe-Verte	PV > C			PV < LBD		
Petit-Rocher	PR > C			PR < LBD		
	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher

For Belowground produce lead concentrations (Table 3.20), ANOVA indicates that the control samples are statistically significantly lower than all the GBA sub-areas. TS is statistically significantly higher than BD, PV and PR and LBD is statistically significantly higher than PV and PR.

Table 3.20: **Analysis of Variance (ANOVA) for Lead in Belowground Produce Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV), Petit-Rocher (PR) and Control Samples (C).**

Control						
Belledune	BD > C					
Townsite #2	TS > C	TS > BD				
Lower Belledune	LBD > C					
Pointe-Verte	PV > C		PV < TS	PV < LBD		
Petit-Rocher	PR > C		PR < TS	PR < LBD		
	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher

For Fruit lead concentrations (Table 3.21), ANOVA indicates that the control samples are statistically significantly lower than BD, TS and LBD but not statistically different from PV and PR.

Table 3.21: **Analysis of Variance (ANOVA) for Lead in Fruit Between Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV), Petit-Rocher (PR) and Control Samples (C).**

Control						
Belledune	BD > C					
Townsite #2	TS > C					
Lower Belledune	LBD > C					
Pointe-Verte				PV < LBD		
Petit-Rocher				PR < LBD		
	Control	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher

A statistical comparison of the produce lead concentration results from this study to the EPCs used in the BAHS was conducted in order to validate the assumptions used in the Health Study.

Figure 3.13 shows the results of the Aboveground Exposed produce lead concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, Aboveground Exposed produce lead results from this study for all of the sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the Aboveground Exposed produce lead results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

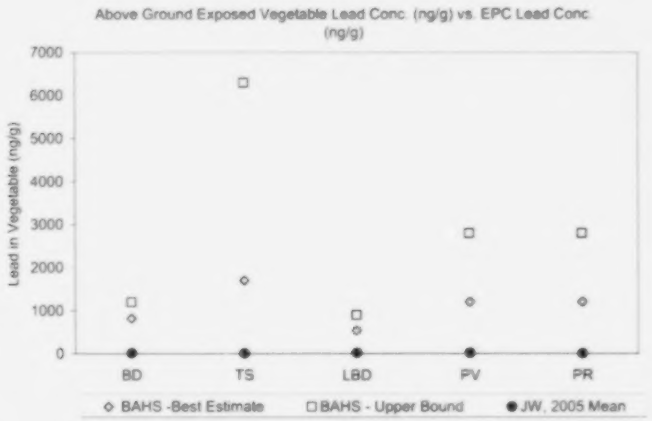

Figure 3.13: **Comparison of Aboveground Exposed Produce Lead Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 3.14 shows the results of the Aboveground Protected produce lead concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, Aboveground Protected produce lead results from this study for all of the sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the Aboveground Protected produce lead results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

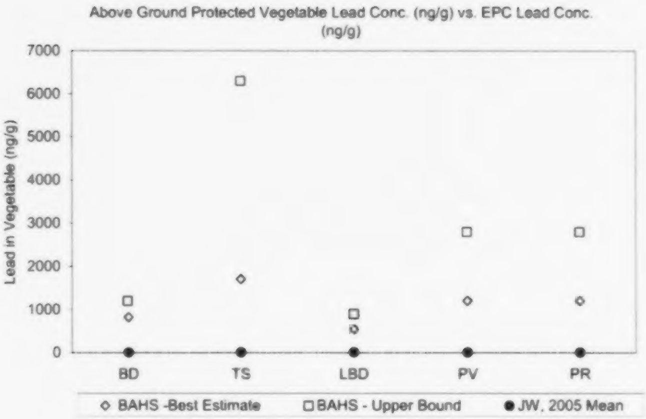

Figure 3.14: **Comparison of Aboveground Protected Produce Lead Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 3.15 shows the results of the Belowground produce lead concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, Belowground produce lead results from this study for all sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the Belowground produce lead results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

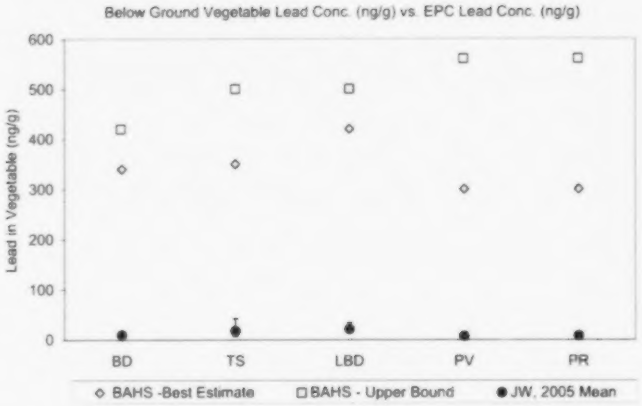

Figure 3.15: **Comparison of Belowground Produce Lead Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 3.16 shows the results of the Fruit lead concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, Fruit lead results from this study for all sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the Fruit lead results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

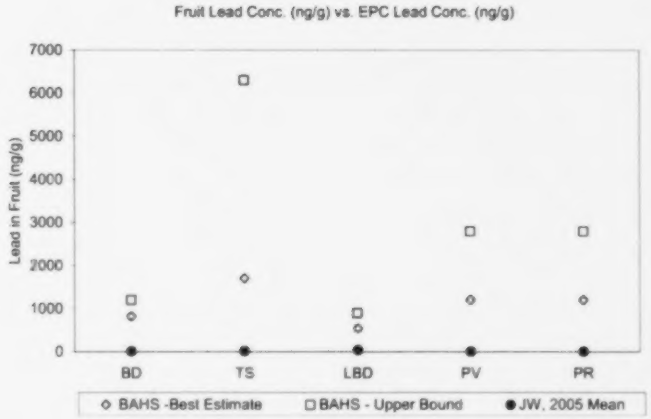

Figure 3.16: **Comparison of Fruit Lead Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Townsite #2 (TS), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

To evaluate the lead distribution within belowground produce, potato samples were peeled and the potato peel was analyzed separately from the potato flesh. Figure 3.17 shows the lead concentration in the potato peel compared to the lead concentration in the potato flesh. The slope that appears on the graph is that of a one-to-one ratio; this was used to indicate that lead levels in the potato peel are higher than the lead levels in the potato flesh.

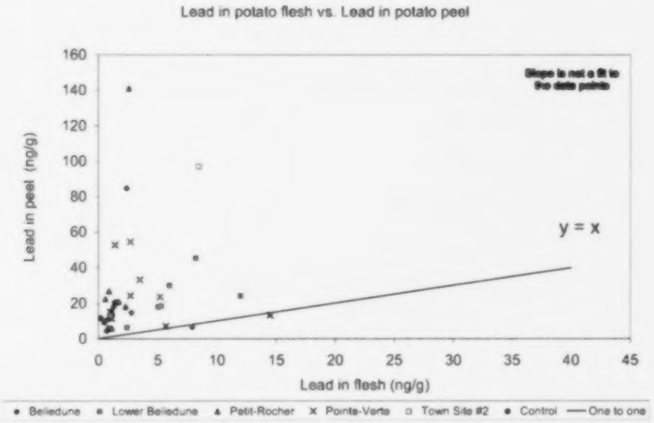

Figure 3.17: **Lead Concentrations in Potato Peel and Potato Flesh from the Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Petit-Rocher (PR), Pointe-Verte (PV), Townsite #2 and Control (C).**

3.2.3 Field Duplicates Quality Assurance and Quality Control (QA/QC)

QA/QC was conducted on the field duplicates in accordance with current Environment Canada guidance on assessing QA/QC. Environment Canada recommends assessing the relative standard deviation (RSD) between the duplicate samples, defined as the standard deviation divided by the arithmetic mean, expressed as a percentage. As a general guide, for soil and groundwater samples, individual parameters should fall within 50% RSD of each other and the average RSD for all parameters should be no more than 30%. However, it should be noted that there is inherent variability in soil (and more so in produce) and that the RSD will occasionally fall outside these general parameters. This is especially true as results approach the detection limit and the inter-duplicate variation can exceed 100%. The results of the duplicate samples for soil and produce are shown in Table 3.22 and Table 3.23, respectively.

Table 3.22: Soil Field Duplicate QA/QC Results.

Duplicate	Individual Cadmium RSD	Individual Lead RSD
SOIL-BD-303	3.45%	14.77%
SOIL-BD-310	5.11%	0.63%
SOIL-BD-351	2.29%	6.38%
SOIL-TS-220	18.68%	11.84%
SOIL-PV-403-2	1.25%	20.86%
SOIL-PR-503	2.67%	8.10%
SOIL-PR-506	4.29%	5.33%
Average RSD	**5.39%**	**9.70%**

Table 3.23: Produce Field Duplicate QA/QC Results.

Duplicate	Individual Cadmium RSD	Individual Lead RSD
APPLE-TS-206	23.19%	9.89%
BEAN-BD-351	0.00%	3.29%
BEAN-LBD-100	22.98%	33.88%
BEAN-PR-504	127.29%	53.20%
BEANS-BD-316	4.50%	50.70%
BEANS-LB-104	11.32%	30.38%
BEAN-TS-204	78.29%	30.38%
BEET-PR-514	47.92%	64.63%
CORN-TS-220	8.17%	12.86%
LETTUCE-FTN-4000	2.77%	60.61%
ONION-TS-208	24.89%	70.19%
RHUBARB-BD-316	40.78%	62.55%
RHUBARB-LB-106	16.50%	68.76%
ROMAINE LETTUCE-FTN-1000	13.94%	11.01%
SWISS CHARD-BD-316	22.48%	1.18%
TOMATO-BD-316	27.23%	12.86%
TOMATO-PR-514	24.31%	32.64%
TOMATO-TS-208	10.53%	24.38%
ZUCCHINI-BD-301	4.59%	7.44%
POTATO-PV-404	43.41%	56.03%
Average RSD	**27.75%**	**34.84%**

As the field duplicates consisted of collecting an extra sample at that specific sampling site, the results from the QA/QC field duplicates provide an indication of the potential for within site variation of cadmium and lead concentrations. Average RSDs for soil fall within the Environment Canada guidelines indicating acceptable consistency in the distribution of cadmium and lead levels within the soil.

While there is more variability in the produce RSDs, average RSDs are close to the 30% target for soils indicating an acceptable level of data quality for produce.

4.0 FINFISH AND BIVALVE MOLLUSKS

Jacques Whitford conducted several sampling events in order to collect the finfish and bivalve mollusks samples required for this study. The sampling dates were as follows: August 9-12, 2005, August 22, 2005 and August 30 to September 1st, 2005. Multiple sampling events were required due to lack of yields at many of the local sampling sites. Some finfish and bivalve mollusks species could not be sampled as they were either out of the study area (e.g., oysters from Heron Island), out of season (herring), none to be found in the study area (flounder) or in limited quantities (clams and trout).

In total, 138 finfish and bivalve mollusks were collected where 102 samples were finfish and 36 samples were bivalve mollusks. Mackerel were caught in the Baie des Chaleurs at BD (22), LBD (11), PV (11) and PR (12) for a total of 56 mackerel samples. During the produce sampling phases, frozen smelt were collected from residents who had locally caught them from the Baie des Chaleurs the previous winter at BD (11), PV (1) and PR (1) for a total of 13 smelt samples. Trout were caught in the Belledune River (11), the Elmtree River (11) and the Little Elmtree River (11) for a total of 33 trout samples. Mussels were harvested in the Baie des Chaleurs at BD (6), LBD (12), PV (6) and PR (6) for a total of 30 mussel samples. Clams were harvested in the Baie des Chaleurs at BD for a total of 6 clam samples.

4.1 Sampling Protocol

Field work was carried out in accordance with Jacques Whitford standard operating practices. Quality assurance and quality control in the field for sampling finfish and bivalve mollusks ensured consistency in the sample collection, handling, and shipping, using experienced field technicians, preparing a detailed field sampling plan, distributing identical field sampling materials to all sampling teams, tracking and coordinating sample shipments through a centralized source and preparing tissue samples in a controlled (laboratory) environment.

4.1.1 Bivalve Mollusks

Bivalve mollusks were sampled in the inter-tidal zone of selected estuaries in the GBA study area. Following common preparation procedures, samples were scrubbed clean with a brush and onsite seawater, and were placed in a 5 gallon bucket containing onsite seawater. In order to expel waste products, the mollusks soaked in the bucket for a 24 hour period. For each site that bivalve mollusks were collected, one sample was not soaked in a bucket for a 24 hour period, instead it was held in an empty bucket for the same period of time. They were then each packaged in a Ziploc bag, clearly identified, and packed on ice in coolers and shipped within 24 hours to the laboratory for preparation (*e.g.*, washing, shucking and homogenization) and analysis. Up to five composite bivalve mollusks samples of each species (mussels and clams) were collected from each sampling site, with each composite sample consisting of 10 or more individual edible-sized bivalve mollusks. The composite sampling strategy was expected to reduce intra- and inter-sample variability, while also increasing the quantity of tissue available for laboratory analysis. Only those parts of the mollusks that are commonly eaten were analyzed.

4.1.2 Finfish

All finfish samples collected were whole fish samples. Fish samples were sampled as individuals and up to 10 individual fish of each species were collected at each sampling site. Whole fish were labeled, and shipped on ice within 24 hours to the analytical laboratory for removal of the edible muscle (fillet with skin on) portion for analysis. Only those parts of the fish that are commonly eaten (*i.e.*, fillet) were analyzed.

4.1.3 Sample Preparation

A variety of initial sample preparation procedures were carried out on the finfish/bivalve mollusks samples (Table 4.1). After decontamination of the various tissue specimens, the samples were homogenized by grating of the fresh sample, grating of a frozen sample portion or chopping with a stainless steel knife.

It should be noted that the sample surface decontamination procedures were not based upon removal of 100% of any possible extraneous sources of trace elements but were designed to reasonably simulate how the sample might be handled during the course of careful food preparation prior to consumption. Similarly, the analytical samples consisted of the portions of the food product that are normally consumed.

Table 4.1: Initial Sample Preparation Procedures for Finfish and Bivalve Mollusks Samples.

Finfish	Sample Preparation
smelt	head off, gutted
mackerel	fillet with skin on
trout	fillet with skin on

Mollusks	Sample Preparation
clams	live - shuck and analyze soft tissues
mussels	live - shuck and analyze soft tissues

Portions (~2-4 g) of tissue samples were accurately weighed into graduated screw-cap polypropylene digestion tubes. Digestion with high-purity nitric acid was carried out in a Teflon coated graphite hot-block digestor.

Samples were diluted to volume (40 mL for tissues) in the digestion vessels.

4.1.4 Laboratory Analysis

Tissue digest samples (fish) were analyzed without further dilution using a Thermo X-7 ICP-MS instrument. Although the actual detection limit is a function of the sample weight used, reporting limits of 0.02 ng/g for cadmium and 0.1 ng/g for lead were achieved. All results for finfish and bivalve mollusks samples were reported on the "as received" (wet weight) basis in ng/g (ppb).

4.1.5 Quality Control and Quality Assurance (QA/QC)

QA/QC samples were prepared and analyzed concurrently with the samples. For the laboratory fortified (spiked) samples, a standard solution containing the target elements was added to a weighed sub-sample of the homogenate prior to digestion and analysis.

Reagent Blanks - Results for the majority of the reagent blanks were close to, or below the reporting limits established for this analytical series. In essentially all cases, reagent blank levels were substantially lower than trace element concentrations detected in the samples. Reagent blank concentrations were calculated on the basis of the average sample weight/volume used for the analytical specimens. Sample results were not corrected for reagent blanks as it would have had no effect on the outcome of the results.

"Spiked" Samples - Calculated analytical spike recoveries for both lead and cadmium ranged from ~75-116% in fish samples. Some of the variability in spike recovery data may have been due to variability in the "base" element concentration in the original specimen (separate sample portions were spiked prior to sample digestion). All spike levels were 12.5 µg/L (for the final solution concentration).

Duplicates - Reproducibility of analytical replicates is a function of variances in digestion recovery and instrument response in addition to factors relating to the homogeneity of the samples. As expected, reproducibility was somewhat poorer for element concentrations approaching the method detection limit.

The relatively high variability for fish and bivalve mollusks replicates was attributed to sample homogeneity. Skin-on fish fillets, for example, were quite difficult to homogenize to a point where 2-4g sub-samples were identical in terms of trace element concentration.

Reference Materials - A number of different reference materials were prepared and analyzed concurrently with the samples. Three different reference materials (NIST 1566b Oyster Tissue, NIST 2976 Mussel Tissue and DORM-2 Dogfish Muscle) were analyzed with the tissue samples with results that were generally consistent but a little on the low side in terms of recoveries.

4.2 Results

The raw data for the finfish and bivalve mollusks can be found in Table D.4 (Appendix D).

For finfish and bivalve mollusks, initial comparisons were made between the sub-areas of the GBA using analysis of variance (ANOVA) to determine whether sub-areas were statistically different from each other (refer to Appendix G for a description of ANOVA) and then the finfish and bivalve mollusks results were compared to the exposure point concentrations (EPCs) presented in the Belledune Area Health Study (BAHS).

The fish EPCs presented in the BAHS for cadmium (Table 4.2) and lead (Table 4.3), which are used to compare the finfish results from this study, are understood to have been based on measurements made prior to 1985. The best estimate EPC was set equal to the mean concentration and this value was used for all sub-areas of the GBA since fish are considered to be mobile in the Baie des Chaleurs. The upper bound EPC was set equal to the UCLM of the measured data for all sub-areas of the GBA.

The JW, 2005 mean values are the geometric means of the data. The geometric mean was used as the results from this study followed a lognormal distribution

Table 4.2: Fish Cadmium EPCs Presented in the BAHS That Were Used to Compare Finfish Cadmium Concentration Results.

CADMIUM Mackerel

Fish (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	69	79	11.17	2.02	15.28	8.17
TS	69	79				
LBD	69	79	14.83	1.59	20.23	10.86
PR	69	79	11.25	2.23	18.71	6.76
PV	69	79	16.67	1.96	26.18	10.62

CADMIUM Smelt

Fish (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	69	79	10.97	1.86	16.63	7.21
TS	69	79				
LBD	69	79				
PR	69	79	4.72		4.72	4.72
PV	69	79	25.53		25.53	25.53

CADMIUM Trout

Fish (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	69	79	17.26	1.64	24.04	12.39
TS	69	79				
LBD	69	79				
PR	69	79	42.17	1.82	63.10	28.12
PV	69	79	31.99	2.64	61.38	16.67

Table 4.3: **Fish Lead EPCs Presented in the BAHS That Were Used to Compare Finfish Lead Concentration Results.**

LEAD Mackerel

Fish (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	2800	3400	4.03	2.55	6.10	2.66
TS	2800	3400				
LBD	2800	3400	3.21	1.64	4.49	2.30
PR	2800	3400	3.49	1.82	5.11	2.39
PV	2800	3400	4.40	1.74	6.37	3.03

LEAD Smelt

Fish (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	2800	3400	18.16	2.32	31.99	10.30
TS	2800	3400				
LBD	2800	3400				
PR	2800	3400	42.17		42.17	42.17
PV	2800	3400	34.60		34.59	34.59

LEAD Trout

Fish (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	2800	3400	24.43	1.66	34.36	17.38
TS	2800	3400				
LBD	2800	3400				
PR	2800	3400	68.39	1.66	96.38	48.64
PV	2800	3400	72.61	2.84	146.56	35.98

The wild mussels EPCs presented in the BAHS for cadmium (Table 4.4) and lead (Table 4.5), which are used to compare the bivalve mollusks results from this study, are understood to have been based on an empirical relationship between measured data and distance from the industrial facilities. The best estimate EPC used was the mean of the predicted concentrations along the shoreline of the GBA. For BD, the upper bound EPCs were based on combining data west of the industrial area and the data for LBD. For LBD and TS, the upper bound EPCs were set equal to the UCLM at the location with the highest concentration. For PV and PR, the upper bound EPCs were set equal to the average of the UCLM at locations along the shoreline.

Table 4.4: **Wild Mussels Cadmium EPCs Presented in the BAHS That Were Used to Compare Bivalve Mollusks Cadmium Concentration Results.**

CADMIUM Mussels

Wild Mussels (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	1000	1260	883.08	1.63	1468.93	529.66
TS	810	1310				
LBD	2130	3300	1324.34	1.69	1845.02	948.42
PR	790	1030	561.05	1.19	672.98	468.81
PV	1010	1230	799.83	1.13	909.91	703.07

CADMIUM Clams

Clams (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	1000	1260	85.90	1.4	121.62	60.53
TS	810	1310				
LBD	2130	3300				
PR	790	1030				
PV	1010	1230				

Table 4.5: **Wild Mussels Lead EPCs Presented in the BAHS That Were Used to Compare Bivalve Mollusks Lead Concentration Results.**

LEAD Mussels

Wild Mussels (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	4230	6660	6591.74	2.91	20230.19	2147.83
TS	1260	3580				
LBD	20300	28700	17947.34	3.02	36224.30	8892.01
PR	1870	3910	1425.61	1.50	2177.71	933.25
PV	8020	10300	7211.08	1.68	12416.52	4178.30

LEAD Clams

Clams (ng/g) wet weight

	BAHS - Best Estimate	BAHS - Upper Bound	JW 2005 Geometric Mean	JW 2005 Standard Deviation	95% Upper Confidence Interval	95% Lower Confidence Interval
BD	4230	6660	1857.80	1.49	2824.88	1221.80
TS	1260	3580				
LBD	20300	28700				
PR	1870	3910				
PV	8020	10300				

We have also compared the mussels that were depurated to non-depurated mussels using AVOVA.

A statistical analysis was not possible for clam samples as they were only harvested from one sampling site; therefore, they are represented in the box and whisker plot (Figure 4.1) but not included in the ANOVA.

The box and whisker plots depict the following statistical criteria: the minimum, the first quartile, the median, the third quartile and the maximum. The box connects the quartiles to the mean and whiskers extend from the first quartile down to the minimum and from the third quartile to the maximum. Outliers in the upper or lower part of the distribution are identified asterisks (refer to Appendix G for a description of box and whisker plots).

In the ANOVA tables, those boxes that remain empty represent sub-areas that are not statistically different from each other. The symbol < should be read as "is lower than". The symbol > should be read as "is greater than".

4.2.1 Cadmium

The initial comparison of cadmium concentrations by bivalve mollusks type for Clams (CLM) and Mussels (MSL) between the sub-areas of the GBA is shown in Figure 4.1 and Table 4.6. The results of the analysis of Variance (ANOVA) for cadmium concentrations between the sub-areas of the GBA are shown in Table 4.7 for MSL.

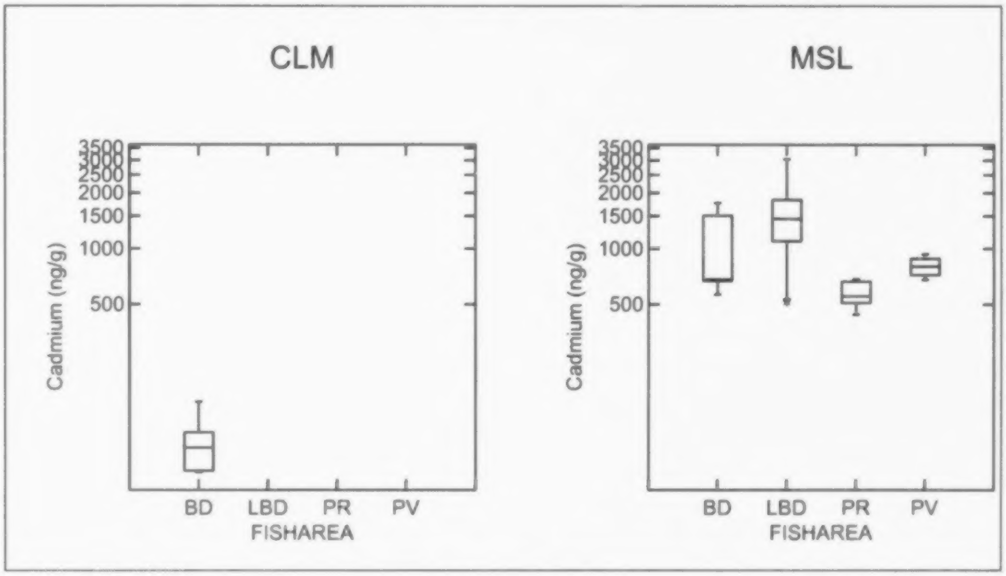

Figure 4.1: **Cadmium Concentrations by Bivalve Mollusks Type for Clams (CLM) and Mussels (MSL) in the GBA Sub-areas (logarithmic scale); Belledune (BD), Lower Belledune (LBD), Petit-Rocher (PR) and Pointe-Verte (PV).**

Table 4.6: **Statistical Values for Cadmium Concentrations by Bivalve Mollusks Type Results Represented in Figure 4.1.**

	BD	LBD	PR	PV
Clams				
N of cases	6			
Minimum	61.5			
Maximum	148			
Median	83.75			
1st quartile (25%)	62.5			
3rd quartile (75%)	101			
Mussels				
N of cases	6	12	6	6
Minimum	565	510	441	680
Maximum	1770	3040	685	936
Median	683	1460	555	803
1st quartile (25%)	670	1100	510	722
3rd quartile (75%)	1510	1835	665	884

For MSL cadmium concentrations (Table 4.7), the ANOVA indicates that LBD is statistically significantly higher than PR.

Table 4.7: **Analysis of Variance (ANOVA) for Cadmium in Mussels Between Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR).**

Belledune				
Lower Belledune				
Pointe-Verte				
Petit-Rocher		PR < LBD		
	Belledune	Lower Belledune	Pointe-Verte	Petit-Rocher

The initial comparison of cadmium concentrations by finfish type for Mackerel (MKRL), Smelt (SMLT) and Trout (TRT) between the sub-areas of the GBA is shown in Figure 4.2 and Table 4.8. The results of the analysis of Variance (ANOVA) for cadmium concentrations between the sub-areas of the GBA are shown in Table 4.9 for MKRL, Table 4.10 for SMLT and Table 4.11 for TRT.

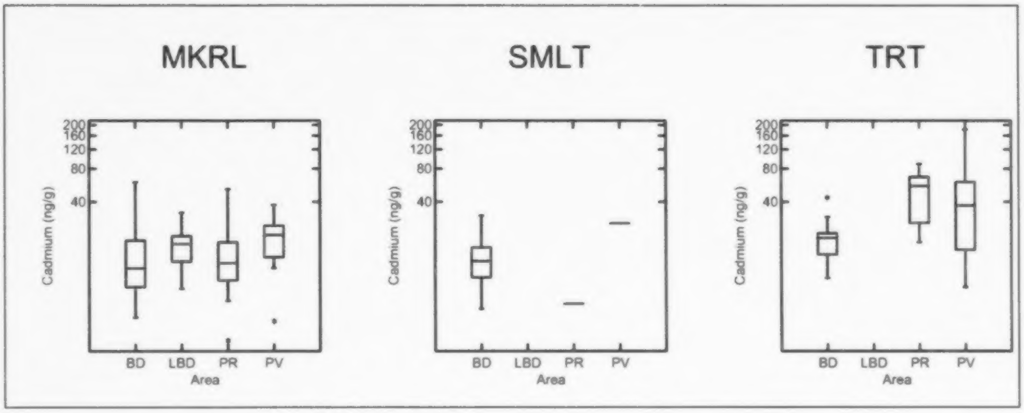

Figure 4.2: Cadmium Concentrations by Finfish Type for Mackerel (MKRL), Smelt (SMLT) and Trout (TRT) in the GBA Sub-areas (logarithmic scale); Belledune (BD), Lower Belledune (LBD), Petit-Rocher (PR) and Pointe-Verte (PV).

Table 4.8: **Statistical Values for Cadmium Concentrations by Finfish Type Results Represented in Figure 4.2.**

	BD	LBD	PR	PV
Mackerel				
N of cases	22	11	12	11
Minimum	3.54	6.47	2.18	3.27
Maximum	60.4	31.8	52.2	37.5
Median	9.94	16.5	11.15	20
1st quartile (25%)	6.71	11.225	7.805	12.275
3rd quartile (75%)	17.8	20.6	17.25	25.25
Smelt				
N of cases	11		1	1
Minimum	4.25		4.72	25.5
Maximum	30		4.72	25.5
Median	11.5		4.72	25.5
1st quartile (25%)	8.137			
3rd quartile (75%)	16.15			
Trout				
N of cases	11		11	11
Minimum	8.1		17.2	6.69
Maximum	43.6		88.3	182
Median	18.7		55.6	36.9
1st quartile (25%)	12.625		24.35	13.7
3rd quartile (75%)	21.525		67.6	62.175

For MKRL cadmium concentrations (Table 4.9), the ANOVA indicates that the sub-areas in the GBA are not statistically different from each other.

Table 4.9: **Analysis of Variance (ANOVA) for Cadmium in Mackerel Between Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR).**

Belledune				
Lower Belledune				
Pointe-Verte				
Petit-Rocher				
	Belledune	Lower Belledune	Pointe-Verte	Petit-Rocher

For SMLT cadmium concentrations (Table 4.10), the ANOVA indicates that the sub-areas in the GBA are not statistically different from each other.

Table 4.10: **Analysis of Variance (ANOVA) for Cadmium in Smelt Between Sub-areas of the GBA; Belledune (BD), Pointe-Verte (PV) and Petit-Rocher (PR).**

Belledune			
Pointe-Verte			
Petit-Rocher			
	Belledune	Pointe-Verte	Petit-Rocher

For TRT cadmium concentrations (Table 4.11), the ANOVA indicates that PR is statistically significantly higher than BD.

Table 4.11: **Analysis of Variance (ANOVA) for Cadmium in Trout Between Sub-areas of the GBA; Belledune (BD), Pointe-Verte (PV) and Petit-Rocher (PR).**

Belledune			
Pointe-Verte			
Petit-Rocher	PR > BD		
	Belledune	Pointe-Verte	Petit-Rocher

A statistical comparison of the finfish and bivalve mollusks cadmium concentration results from this study to the findings in the BAHS was conducted in order to validate the assumptions used in the BAHS.

Figure 4.3 shows the results of the mussel cadmium concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, mussel cadmium results from this study for LBD, PV and PR are lower than the best estimate and upper bound EPCs presented in the BAHS. Mussel cadmium results from this study for BD are not statistically different from the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the mussel cadmium results from this study are lower than or not statistically different from the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

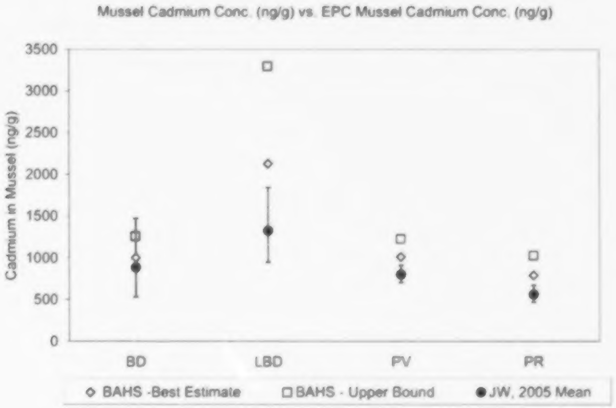

Figure 4.3: **Comparison of Mussel Cadmium Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 4.4 shows the results of the mackerel cadmium concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, mackerel cadmium results from this study for all sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the mackerel cadmium results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

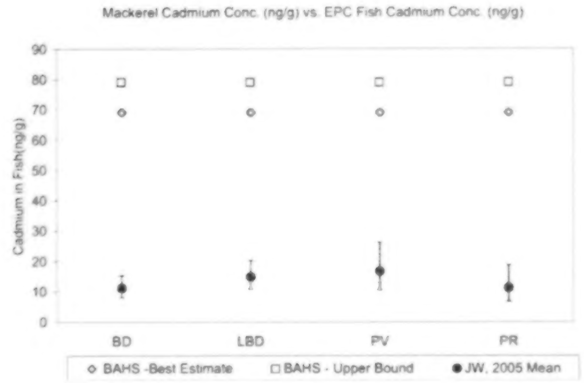

Figure 4.4: **Comparison of Mackerel Cadmium Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 4.5 shows the results of the smelt cadmium concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, smelt cadmium results from this study for all sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the smelt cadmium results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

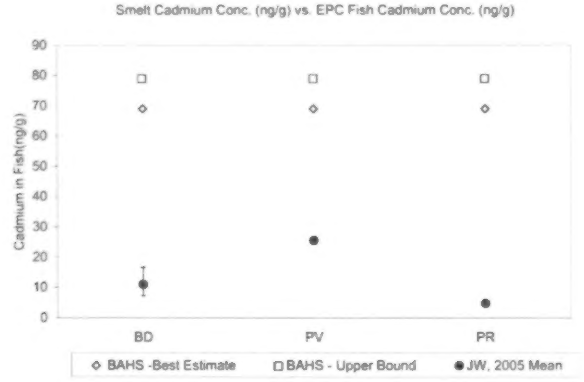

Figure 4.5: **Comparison of Smelt Cadmium Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 4.6 shows the results of the trout cadmium concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, trout cadmium results from this study for all sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the trout cadmium results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

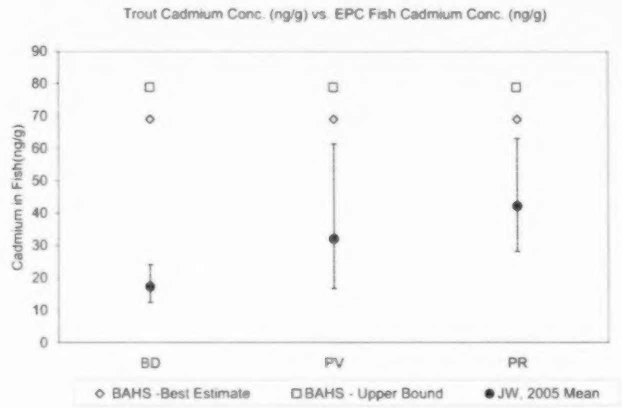

Figure 4.6: **Comparison of Trout Cadmium Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 4.7 and Table 4.12 show the comparison between the depurated (soaked for 24 hours) mussel cadmium concentrations to the non-depurated mussel cadmium concentration. An ANOVA was conducted which indicated that these cadmium concentrations were not statistically different from each other.

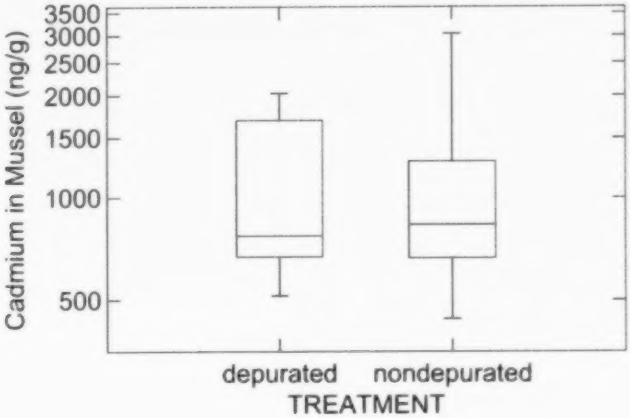

Figure 4.7: Cadmium Concentrations of depurated (soaked) Mussels and Non-Depurated (not soaked) Mussels (logarithmic scale).

Table 4.12: Statistical Values for Cadmium Concentrations of Depurated and Non-Depurated (not soaked) Mussels Results Represented in Figure 4.7.

	Depurated	Non-Depurated
N of cases	5	25
Minimum	515	441
Maximum	2030	3040
Median	772	834
1st quartile (25%)	631.25	647.5
3rd quartile (75%)	1775	1337.5

4.2.2 Lead

The initial comparison of lead concentrations by bivalve mollusks type for Clams (CLM) and Mussels (MSL) between the sub-areas of the GBA is shown in Figure 4.8 and Table 4.13. The results of the analysis of Variance (ANOVA) for lead concentrations between the sub-areas of the GBA are shown in Table 4.14 for MSL.

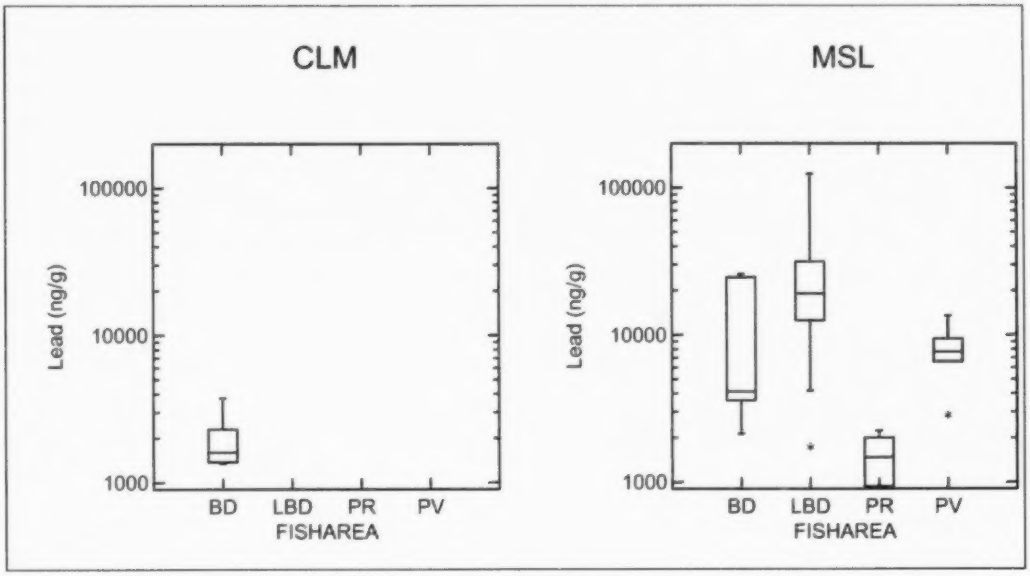

Figure 4.8: **Lead Concentrations by Bivalve Mollusks Type for Clams (CLM) and Mussels (MSL) in the GBA Sub-areas (logarithmic scale); Belledune (BD), Lower Belledune (LBD), Petit-Rocher (PR) and Pointe-Verte (PV).**

Table 4.13: **Statistical Values for Lead Concentrations by Bivalve Mollusks Type Results Represented in Figure 4.8.**

	BD	LBD	PR	PV
Clams				
N of cases	6			
Minimum	1350			
Maximum	3740			
Median	1615			
1st quartile (25%)	1380			
3rd quartile (75%)	2300			
Mussels				
N of cases	6	12	6	6
Minimum	2130	1730	925	2840
Maximum	25900	124000	2240	13500
Median	4115	19100	1520	7670
1st quartile (25%)	3590	12550	935	6580
3rd quartile (75%)	24600	31500	2000	9420

For MSL lead concentrations (Table 4.14), the ANOVA indicates that PR is statistically significantly lower than BD, LBD and PV.

Table 4.14: **Analysis of Variance (ANOVA) for Lead in Mussels Between Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR).**

Belledune				
Lower Belledune				
Pointe-Verte				
Petit-Rocher	PR < BD	PR < LBD	PR < PV	
	Belledune	Lower Belledune	Pointe-Verte	Petit-Rocher

The initial comparison of lead concentrations by finfish type for Mackerel (MKRL), Smelt (SMLT) and Trout (TRT) between the sub-areas of the GBA is shown in Figure 4.9 and Table 4.15. The results of the analysis of Variance (ANOVA) for lead concentrations between the sub-areas of the GBA are shown in Table 4.16 for MKRL, Table 4.17 for SMLT and Table 4.18 for TRT.

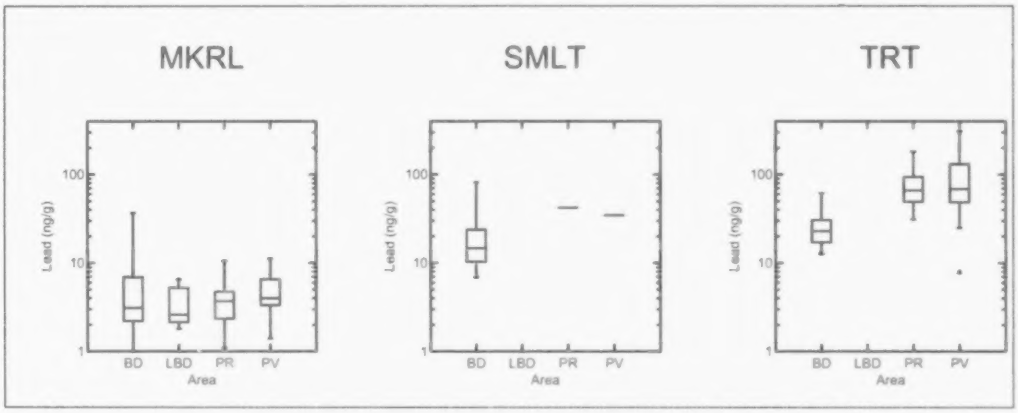

Figure 4.9: **Lead Concentrations by Finfish Type for Mackerel (MKRL), Smelt (SMLT) and Trout (TRT) in the GBA Sub-areas (logarithmic scale); Belledune (BD), Lower Belledune (LBD), Petit-Rocher (PR) and Pointe-Verte (PV).**

	BD	LBD	PR	PV
Mackerel				
N of cases	22	11	12	11
Minimum	1	1.8	1.1	1.4
Maximum	36.8	6.5	10.5	11.2
Median	3.1	2.6	3.7	4
1st quartile (25%)	2.2	2.075	2.35	3.275
3rd quartile (75%)	6.9	5.525	4.75	6.775
Smelt				
N of cases	11		1	1
Minimum	6.9		42.2	34.6
Maximum	81.9		42.2	34.6
Median	14.7		42.2	34.6
1st quartile (25%)	9.775			
3rd quartile (75%)	25.05			

	BD	LBD	PR	PV
Trout				
N of cases	11		11	11
Minimum	12.7		31.2	7.9
Maximum	61.8		181	308
Median	23		66.1	68.7
1st quartile (25%)	17.025		49.4	44.225
3rd quartile (75%)	32.2		102.575	132.25

For MKRL lead concentrations (Table 4.16), the ANOVA indicates that the sub-areas in the GBA are not statistically different from each other.

Table 4.15: **Analysis of Variance (ANOVA) for Lead in Mackerel Between Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR).**

Belledune				
Lower Belledune				
Pointe-Verte				
Petit-Rocher				
	Belledune	Lower Belledune	Pointe-Verte	Petit-Rocher

For SMLT lead concentrations (Table 4.17), the ANOVA indicates that the sub-areas in the GBA are not statistically different from each other.

Table 4.16: **Analysis of Variance (ANOVA) for Lead in Smelt Between Sub-areas of the GBA; Belledune (BD), Pointe-Verte (PV) and Petit-Rocher (PR).**

Belledune			
Pointe-Verte			
Petit-Rocher			
	Belledune	Pointe-Verte	Petit-Rocher

For TRT lead concentrations (Table 4.18), the ANOVA indicates that BD is statistically significantly lower than PV and PR.

Table 4.17: **Analysis of Variance (ANOVA) for Lead in Trout Between Sub-areas of the GBA; Belledune (BD), Pointe-Verte (PV) and Petit-Rocher (PR).**

Belledune			
Pointe-Verte	PV > BD		
Petit-Rocher	PR > BD		
	Belledune	Pointe-Verte	Petit-Rocher

A statistical comparison of the finfish and bivalve mollusks lead concentration results from this study to the findings in the BAHS was conducted in order to validate the assumptions used in the Health Study.

Figure 4.10 shows the results of the mussel lead concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, mussel lead results from this study for BD, LBD and PV are not statistically different from the best estimate and upper bound EPCs presented in the BAHS. Mussel lead results from this study for PR are not statistically different from the best estimate EPCs presented in the BAHS and are lower than the upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the mussel lead results from this study are lower than or not statistically different from the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

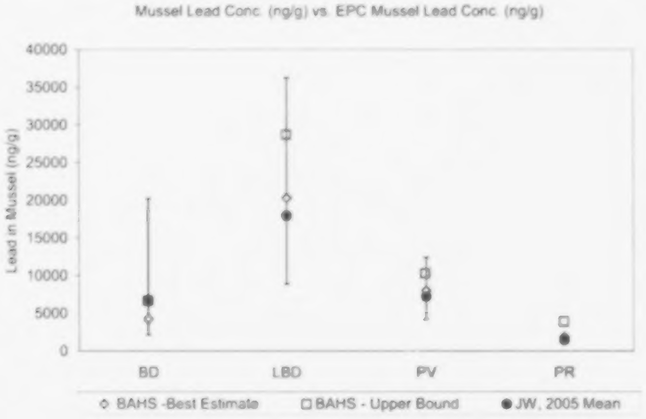

Figure 4.10: **Comparison of Mussel Lead Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 4.11 shows the results of the mackerel lead concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, mackerel lead results from this study for all sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the mackerel lead results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

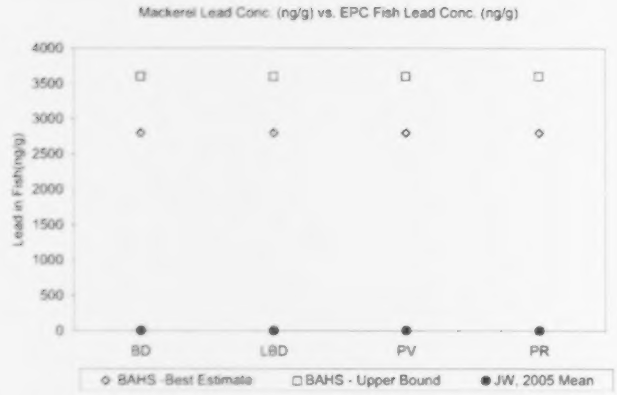

Figure 4.11: **Comparison of Mackerel Lead Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Lower Belledune (LBD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 4.12 shows the results of the smelt lead concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, smelt lead results from this study for all sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the smelt lead results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

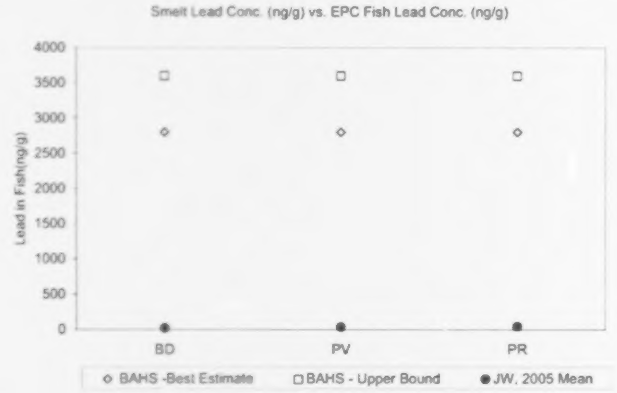

Figure 4.12: **Comparison of Smelt Lead Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA; Belledune (BD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 4.13 shows the results of the trout lead concentrations from this study compared to the best estimate EPC and upper bound EPC presented in the BAHS. Based on this comparison, trout lead results from this study for all sub-areas of the GBA are lower than the best estimate and upper bound EPCs presented in the BAHS.

The significance of these findings indicates that the trout lead results from this study are lower than the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure.

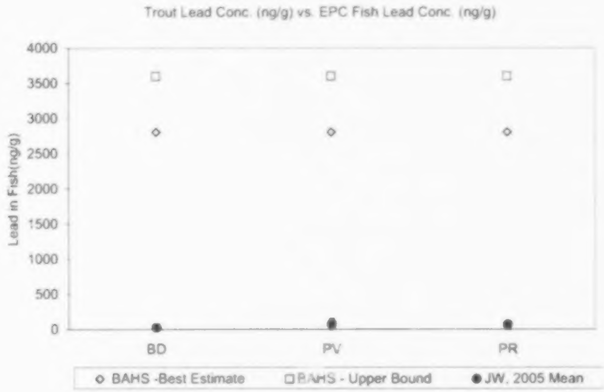

Figure 4.13: **Comparison of Trout Lead Concentrations with Best Estimate and Upper Bound EPCs Presented in the BAHS. JW 2005 Mean is the Geometric Mean of all Samples in the Sub-areas of the GBA: Belledune (BD), Pointe-Verte (PV) and Petit-Rocher (PR). The Error Bars Represent the 95th Upper Confidence Level of the Mean (UCLM) and the 95th Lower Confidence Level of the Mean (LCLM).**

Figure 4.14 and Table 4.19 show the comparison between the depurated (soaked for 24 hours) mussel lead concentrations to the non-depurated mussel lead concentration. An ANOVA was conducted which indicated that these lead concentrations were not statistically different from each other.

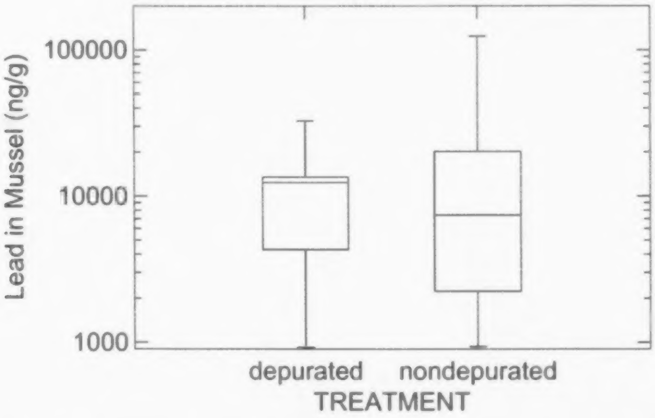

Figure 4.14: **Lead Concentrations of depurated (soaked) Mussels and Non-Depurated (not soaked) Mussels (logarithmic scale).**

Table 4.18: **Statistical Values for Lead Concentrations of Depurated and Non-Depurated (not soaked) Mussels Results Represented in Figure 4.14.**

	Depurated	Non-Depurated
N of cases	5	25
Minimum	925	935
Maximum	32800	124000
Median	12400	7420
1st quartile (25%)	3463.75	2212.5
3rd quartile (75%)	18325	21300

5.0 CONCLUSIONS

Jacques Whitford completed an environmental sampling study in the GBA on behalf of the NBDH including collection and analysis of garden produce, finfish, and bivalve mollusks. In total, 74 gardens were included in the study, yielding 446 produce samples and 98 soil samples from the GBA. In addition, 84 produce control samples were collected in Fredericton and surrounding area. A total of 102 finfish and 36 bivalve mollusks samples were collected from the near-shore and inter-tidal areas within the GBA. Based on the results of the sampling, Tables 5.1 to 5.5 provide a summary of results.

The tables indicate whether the results from this study for each GBA sub-area are statistically significantly higher (ANOVA $p < 0.05$), statistically significantly lower (ANOVA $p > 0.05$) or not statistically different (NSD) (ANOVA $p = 1$) from control samples and/or the BAHS best estimate or upper bound EPCs.

Table 5.1: Summary of Results – Belledune

		BAHS EPCs	
	Control Samples	**Best Estimate**	**Upper Bound**
Cadmium			
Soil	Higher	NSD	NSD
Aboveground Protected Produce	NSD	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	NSD
Lead			
Soil	Higher	Higher	NSD
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	NSD

As indicated, Belledune results for all environmental media (soil, produce, finfish/bivalve mollusks) are lower than or not statistically different from the EPCs used in the BAHS, except for the soil lead concentrations which are higher than the best estimate EPC but not statistically different from the upper bound EPC. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure. The results also show that cadmium concentrations measured in soil, belowground produce, and fruit as well as lead concentrations in soil, aboveground protected and belowground produce, and fruit in Belledune were higher than the concentrations measured in control samples from the Fredericton region.

Table 5.2: Summary of Results – Townsite #2

		BAHS EPCs	
	Control Samples	**Best Estimate**	**Upper Bound**
Cadmium			
Soil	Higher	Lower	Lower
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	NSD	NSD
Fruit	Higher	Lower	Lower
Finfish	--	--	--
Bivalve Mollusks	--	--	--
Lead			
Soil	Higher	NSD	Lower
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	--	--
Bivalve Mollusks	--	--	--

As indicated, Townsite #2 results for all environmental media (soil, produce, finfish/bivalve mollusks) are lower than or not statistically different from the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure. The results also show that cadmium and lead concentrations measured in soil, aboveground protected produce, belowground produce, and fruit in Townsite #2 were higher than the concentrations measured in control samples from the Fredericton region.

Table 5.3: Summary of Results – Lower Belledune

		BAHS EPCs	
	Control Samples	**Best Estimate**	**Upper Bound**
Cadmium			
Soil	Higher	NSD	Lower
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	NSD	NSD
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	NSD	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	Lower	Lower
Lead			
Soil	Higher	NSD	Lower
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	Higher	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	NSD

As indicated, Lower Belledune results for all environmental media (soil, produce, finfish/bivalve mollusks) are lower than or not statistically different from the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure. The results also show that cadmium concentrations measured in soil, aboveground protected produce, belowground produce, and fruit, as well as lead concentrations in soil, all produce, and fruit in Lower Belledune were higher than the concentrations measured in control samples from the Fredericton region.

Table 5.4: Summary of Results – Pointe-Verte

		BAHS EPCs	
	Control Samples	**Best Estimate**	**Upper Bound**
Cadmium			
Soil	Higher	NSD	NSD
Aboveground Protected Produce	NSD	Lower	Lower
Aboveground Exposed Produce	NSD	NSD	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	Lower	Lower
Lead			
Soil	Higher	NSD	NSD
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	Higher	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	NSD	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	NSD

As indicated, Pointe-Verte results for all environmental media (soil, produce, finfish/bivalve mollusks) are lower than or not statistically different from the EPCs used in the BAHS. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure. The results also show that cadmium concentrations measured in soil, belowground produce, and fruit, as well as lead concentrations in soil, aboveground exposed and protected produce, and belowground produce in Pointe Verte were higher than the concentrations measured in control samples from the Fredericton region.

Table 5.5: Summary of Results – Petit Rocher

		BAHS EPCs	
	Control Samples	**Best Estimate**	**Upper Bound**
Cadmium			
Soil	Higher	Higher	Higher
Aboveground Protected Produce	NSD	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	Higher	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	Lower	Lower

Table 5.5: **Summary of Results – Petit Rocher**

		BAHS EPCs	
	Control Samples	**Best Estimate**	**Upper Bound**
Lead			
Soil	Higher	Higher	NSD
Aboveground Protected Produce	Higher	Lower	Lower
Aboveground Exposed Produce	NSD	Lower	Lower
Belowground Produce	Higher	Lower	Lower
Fruit	NSD	Lower	Lower
Finfish	--	Lower	Lower
Bivalve Mollusks	--	NSD	Lower

As indicated, Petit Rocher results for all environmental media (soil, produce, finfish/bivalve mollusks) are lower than or not statistically different from the EPCs used in the BAHS, except for the soil cadmium and lead concentrations. Soil cadmium concentrations are higher than both the best estimate and upper bound EPCs, whereas soil lead concentrations are higher than the best estimate EPC but not statistically different from the upper bound EPC. This suggests that the intakes calculated in the BAHS for these exposure pathways were based on conservative estimates of exposure. The results also show that cadmium concentrations measured in soil, belowground produce, and fruit, as well as lead concentrations in soil, aboveground protected produce, and belowground produce were higher than the concentrations measured in control samples from the Fredericton region.

It must be noted that although soil lead concentrations in BD and PR for this study were determined to be statistically significantly higher than the BAHS best estimate EPC, both results from this study as well as the BAHS EPC are lower than the CCME residential soil quality guideline for lead of 140 mg/kg.

Although soil cadmium concentrations in PR for this study were determined to be statistically significantly higher than the BAHS best estimate and upper bound EPCs, both results from this study as well as the BAHS EPCs are lower than the CCME residential soil quality guideline for cadmium of 10 mg/kg.

In general, the results of this study yield two summary conclusions:

1) The cadmium and lead concentrations measured in soil, produce, finfish, and bivalve mollusks are generally lower than, or not statistically different from the EPCs used in the BAHS. Therefore, these results validate that the EPC assumptions used in the BAHS for these environmental media were appropriate and conservative.

2) The cadmium and lead concentrations measured in soil and produce in the GBA are often higher than the cadmium and lead concentrations measured in equivalent control samples from outside the GBA.

Given these results, SENES was asked to use the measured data collected by Jacques Whitford to substitute into the risk calculations that were carried out for the BAHS which was finished in 2005. Their results are provided verbatim here and details are presented in Appendix F.
According to SENES:

"In summary, the use of the 2005 measured data does not substantially change the results of the previous risk assessment. This current assessment has demonstrated the following:

- *The backyard vegetable and fruit concentrations represent a very small portion of the exposure to individuals living in the Belledune area and thus any changes in EPC concentrations between the two risk assessments does not impact the overall results.*
- *A reduction in the uncertainty in the fish data has occurred, especially for lead, indicating that fish consumption is not a major exposure pathway.*

Mussel consumption is still a major exposure pathway for both cadmium and lead. However, the revised mussel EPCs were still uncertain due to the small number of samples. The removal of this exposure pathway results in cadmium and lead exposures that are below their respective TRVs."

6.0 REFERENCES

Belledune Area Health Study (BAHS). 2005. Environmental & Occupational Health +Plus, Goss Gilroy Inc., and Senes Consultants Limited. *Belledune Area Health Study: Summary Report.* Prepared for Department of Health and Wellness, Government of New Brunswick. February 2005.

Jacques Whitford. 2005. Pilot Study for Background Soil Bioassay sampling and Associated Activities in Atlantic Canada. Report to Public Works and Government Services Canada and Environment Canada. March 2005.

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Samuels, M.L., and Witmer, J.A. (1999) Statistics for the Life Sciences. 2nd Edition, Prentice Hall, New Jersey. 682 pp.

Systat® for Windows® version 10.2.01 licensed to Jacques Whitford user, copyright © SYSTAT software Inc., 2002.

APPENDIX A

Figure

Jacques

APPENDIX B

Public Communication Materials

Jacques

Telegraph Journal Newspaper Advertisement

ATTENTION:

RESIDENTS OF BELLEDUNE, PETIT-ROCHER
POINTE-VERTE AND LOCAL SERVICE DISTRICTS

Information sessions from 4 - 8 pm

English: Tuesday, July 19, 2005

Belledune Community Centre

French: Wednesday, July 20, 2005

Complexe Madisco in Petit-Rocher

WE NEED YOUR HELP

As a follow up to the "Belledune Area Health Study", the Department of Health and Wellness has asked Jacques Whitford to conduct a study to determine the concentration of lead and cadmium in backyard garden produce and in fish / shellfish in the Belledune Area.

The success of this study depends on your participation.

We are looking for volunteers to:

For those interested in becoming volunteers, please contact Anne Vinette at Jacques Whitford 1 888 867 8122

1) provide permission to sample produce and soil in their backyard gardens and

2) provide information on fishing locations and fish consumption habits in the area.

L'Acadie Nouvelle Newspaper Advertisement

ATTENTION:

RÉSIDENTS DE BELLEDUNE, PETIT-ROCHER, POINTE-VERTE
ET DISTRICTS DE SERVICES LOCAUX DE LA RÉGION

Séances d'information de 16 h à 20 h

anglais : le mardi 19 juillet 2005

Centre Communautaire de Belledune

français : le mercredi 20 juillet 2005

Complexe Madisco à Petit-Rocher

NOUS AVONS BESOIN DE VOTRE AIDE

Suite à «L'Étude sur la santé dans la région de Belledune» , le ministère de la Santé et du Mieux-être a demandé à Jacques Whitford de faire une étude pour déterminer la concentration de plomb et de cadmium dans les légumes de jardin et les poissons dans la région de Belledune.

Le succès de cette étude dépend de votre participation.

Nous recherchons des volontaires pour :

Pour ceux et celles intéressés à se porter volontaire svp rejoindre Anne Vinette à Jacques Whitford 1 888 867 8122

1) obtenir la permission d' échantillonner dans leurs jardins; et

2) obtenir de l'information quant aux habitudes de pêche et de consommation de poissons dans la région.

Information Sessions Poster

Jacques
Whitford

ATTENTION:

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The success of this study depends on your participation. We are looking for volunteers to:

1) Provide permission to sample produce and soil in their backyard gardens and

2) Provide information on fishing locations and fish consumption habits in the area.

For those interested in becoming volunteers, please contact Anne Vinette at Jacques Whitford 1 888 867 8122

THE DEADLINE FOR HANDING IN THE QUESTIONNAIRES IS FRIDAY, AUGUST 5 2005

Questionnaire Mailed to Residents of the Greater Belledune Area

Belledune Area Lead and Cadmium Study Questionnaire

We need your help. Please fill out this questionnaire so that we can learn more about metal (lead and cadmium) concentrations in garden produce and fish in the Belledune area. This study is being conducted by the New Brunswick Department of Health and Wellness to provide additional information to the Belledune Area Health Study. We need volunteers who will:

- Let us sample their backyard garden soil and produce; and
- Tell us how much fish and shellfish they eat, and where it comes from.

Please fill out the questionnaire with as much information as you would like to give us. When you are finished, please return the questionnaire in **one** of the following ways:

Drop off at:	the village municipal building in your community, OR
Bring it to:	the **Information Session** that will be held in your community, OR
Mail it:	using the pre-addressed and pre-paid envelopes that will be available at the **information session**

Section 1 – Participant Information

Name: ____________________

Address: ____________________

(Civic Number and Street) *(Municipality)*

Phone Number: __________ __________

(Daytime) *(Evening)*

Section 2 – Backyard Garden (*note: the number of gardens sampled will depend on the number of volunteers. If there are many volunteers, it is possible that your garden will not be sampled. If your garden is selected, we will contact you to make appropriate arrangements before sampling).*

Do you have a backyard vegetable garden we could sample? ☐ YES ☐ NO

How big is your garden?

Small ☐	Medium ☐	Large ☐
(less than 25 m^2)	(between 25 m^2 and 50 m^2)	(more than 50 m^2)

What do you grow in your vegetable garden?

Section 3 – Fish and Shellfish

Do you eat **fish** (such as smelt, herring, mackerel, or cod) as part of your diet? ☐ YES ☐ NO

What kinds of **fish** do you eat?

How often do you eat a meal of **fish**? more than once a week ☐ once a week ☐ once a month ☐ rarely ☐

Where do you get your **fish**?

☐ I catch it myself Where?

☐ I buy it Where?

Do you eat **shellfish** (such as mussels, clams, crab, or lobster) as part of your diet? ☐ YES ☐ NO

What kinds of **shellfish** do you eat?

How often do you eat a meal of **shellfish**? more than once a week ☐ once a week ☐ once a month ☐ rarely ☐

Where do you get your **shellfish**?

☐ I harvest it myself Where?

☐ I buy it Where?

Do you have locally caught fish, such as smelt, in your freezer, and would you be willing to give us a sample? ☐ YES ☐ NO

Should you have any questions about the study, please contact Anne Vinette at 1 888 867 8122.

We appreciate any help you can provide.

Information Sessions Poster Boards

Jacques
Whitford

BIENVENUE À LA SÉANCE D'INFORMATION POUR L'ÉTUDE ENVIRONNEMENTALE D'ÉCHANTILLONNAGE DANS LA RÉGION DE BELLEDUNE

WELCOME TO THE BELLEDUNE AREA ENVIRONMENTAL SAMPLING STUDY INFORMATION SESSION

BELLEDUNE AREA HEALTH STUDY

Summary of Relevant Findings

- The study identified that the key potential issues in the community related to industrial activity were concentrations of lead and cadmium in the environment.
- The study identified the following limitations:
- Concentrations of metals in fish/shellfish used in the assessment were 25 years old
- Data available for backyard vegetables are sparse
- Recommendations from the study were:
- Programs be implemented in the Greater Belledune Area (GBA) to collect data (metal concentrations) on fish/shellfish from the Baie des Chaleurs
- To obtain additional data (metal concentrations) on garden vegetable produce across the GBA

ÉTUDE SUR LA SANTÉ DANS LA RÉGION DE BELLEDUNE

Sommaire des résultats pertinents

- L'étude a identifié que les principaux problèmes potentiels dans la communauté liés aux activités industrielles étaient des concentrations de plomb et de cadmium dans l'environnement.
- L'étude a cerné les limitations suivantes :
- Les données de concentrations dans les poissons utilisées dataient de 25 ans
- Les données disponibles pour les légumes de jardin sont minimes
- Les recommandations de l'étude étaient :
- La mise en œuvre, dans la grande région de Belledune (GRB), de programmes de collecte de données (concentrations de métaux) chez les poissons/crustacés dans la Baie des Chaleurs
- La collecte de données additionnelles (concentrations de métaux) au sujet des légumes de jardin cultivés à l'échelle de la GRB

PURPOSE OF THIS STUDY

- The objective of this study is to answer the following question:

What is the current distribution of lead and cadmium in homegrown produce and fish/shellfish in the Greater Belledune Area?

- The study will be carefully planned to ensure that the data is accurate and representative.
- It is not the intent to complete a new health risk assessment.

BUT DE CETTE ÉTUDE

- L'objectif de cette étude est de répondre à la question suivante:

Quelle est la distribution actuelle de plomb et de cadmium dans les légumes de jardin et les poissons/crustacés dans la grande région de Belledune?

- L'étude sera planifiée soigneusement pour assurer que les données sont précises et représentatives.
- L'étude n'a pas pour but de faire une nouvelle évaluation des risques pour la santé.

APPROACH TO STUDY – BACKYARD GARDEN PRODUCE

- Community participation will be key to the success of the study.
- Residents are asked to volunteer to have their garden soil and produce sampled.
- The study area includes the villages of Belledune, Pointe-Verte and Petit-Rocher, including the areas denoted as Townsite #2 and Lower Belledune in the Belledune Area Health Study.
- Samples collected will be representative of the produce grown in the region and would include:
- Root vegetables such as carrots or potatoes
- Aboveground vegetables such as cabbage or corn
- Fruit such as tomatoes or raspberries
- Information provided by local residents will help direct the study. Emphasis will be placed on areas identified in the Belledune Area Health Study as areas of higher priority.

APPROCHE À L'ÉTUDE – LÉGUMES DE JARDIN

- La participation de la communauté sera la clé du succès de l'étude.
- Les résidents sont invités à se porter volontaire pour que la terre et les légumes dans leur jardin soient échantillonnés.
- La région visée par l'étude comprend les villages de Belledune, Pointe-Verte et Petit-Rocher, ainsi que les endroits dénotés comme Townsite no 2 et Lower Belledune dans l'Étude sur la santé dans la région de Belledune.
- Les échantillons recueillis seront représentatifs des légumes qui poussent dans la région et comprendront :
- Légumes à racines, tels que carottes ou patates
- Légumes cultivés à la surface, tels que choux ou maïs
- Fruits, tels que tomates ou framboises
- L'information offerte par les résidents de la région aidera à diriger l'étude. L'emphase sera mise aux endroits identifiés dans l'Étude sur la santé dans la région de Belledune comme des endroits de priorité élevée.

APPROACH TO STUDY – FISH AND SHELLFISH

- Community participation will be key to the success of the study.
- Residents are asked to provide information on where they fish locally, the species of fish they catch, and how much they consume, as well as identifying areas where shellfish are harvested.
- The study area includes the portion of the Baie des Chaleurs surrounding the Belledune area, river mouths and estuaries.
- Species to be sampled may include:
- Fish: tomcod, bass, herring, mackerel
- Mollusk: mussels, clams
- The fish and shellfish species that will be sampled will be determined by what the local residents actually fish and consume from the GBA.

APPROCHE À L'ÉTUDE – POISSONS ET CRUSTACÉS

- La participation de la communauté sera la clé du succès de l'étude.
- Les résidents sont invités à offrir de l'information sur les endroits où ils pêchent localement, les espèces de poissons qu'ils pêchent, et combien ils en consomment, ainsi que d'indiquer les endroits où les crustacés sont pêchés.
- La région de l'étude comprend la portion de la Baie des Chaleurs environnant la région de Belledune, les embouchures de rivières et les estuaires.
- Les espèces qui seront échantillonnées pourraient comprendre :
- Poissons : poulamon, achigan, hareng, maquereau
- Mollusques : moules, coques
- Les espèces de poissons et de crustacés qui seront échantillonnés seront déterminés d'après ce que les résidents de la région pêchent et consomment dans la GRB.

WHAT WILL HAPPEN WITH THE RESULTS?

- Lead and cadmium concentrations in garden produce and fish/shellfish will be compared to those in the Belledune Area Health Study to validate the assumptions made in that study.
- Jacques Whitford will provide the sample results and comparisons to the New Brunswick Department of Health and Wellness.
- This study may lead to recommendations to local residents on ways to limit their potential exposure.

QU'ADVIENDRA-T-IL DES RÉSULTATS?

- Les concentrations de plomb et de cadmium dans les légumes de jardin et les poissons/crustacés seront comparées avec celles de l'Étude sur la santé dans la région de Belledune pour valider les suppositions faites dans cette étude.
- Jacques Whitford fournira les résultats des échantillons et les comparaisons au ministère de la Santé et du Mieux-être du Nouveau-Brunswick.
- Cette étude entraînera peut-être des recommandations aux résidents locaux sur des façons de limiter leur exposition potentielle.

WHAT TO DO WITH QUESTIONNAIRES AFTER THE INFORMATION SESSIONS?

- **The deadline for handing in the questionnaires is Friday, August 5th 2005.**
- You can drop it off at any of the following municipal buildings:
- Belledune
- Pointe-Verte
- Petit-Rocher
- Pre-addressed and pre-paid envelopes are also available at the village municipal buildings noted above if you choose to mail it to us.

QUE FAIRE AVEC LES QUESTIONNAIRES APRÈS LES SÉANCES D'INFORMATION?

- **La date limite pour remettre les questionnaires est le vendredi 5 août 2005.**
- Vous pouvez les déposer à l'édifice municipal du village de :
- Belledune;
- Pointe-Verte; ou
- Petit-Rocher
- Des enveloppes pré-adressées et pré-payées sont disponibles aux édifices municipaux notés ci-haut si vous choisissez de nous les poster.

Belledune Days Poster

ATTENTION:

RESIDENTS OF BELLEDUNE, PETIT-ROCHER, POINTE-VERTE, AND LOCAL SERVICE DISTRICTS

Jacques Whitford will have an information booth at the Belledune Community Centre on Saturday, July 30th, 2005 during the Belledune Days Festival

We are still looking for volunteers to participate in the Belledune Area Environmental Sampling Study.

Please visit our booth to meet staff from Jacques Whitford and
- ask questions about the study,
- provide information that will help carry out the study, or
- fill out a questionnaire

The success of this study depends on your participation.

We are looking for volunteers to:
1) Provide permission to sample produce and soil in their backyard gardens, and
2) Provide information on fishing locations and fish consumption habits in the area.

For those interested in becoming volunteers, please call toll free: 1-888-867-8122 (Jacques Whitford information line)

THE DEADLINE FOR HANDING IN THE QUESTIONNAIRES IS FRIDAY AUGUST 5, 2005

Sampling Consent Form

Belledune Environmental Sampling Study Consent Form

I, ___________________________ (print full name), have agreed to give technicians from Jacques Whitford permission to access my property and take soil and produce samples in order to have them analyzed to determine their concentrations of lead and cadmium.

________________	________________________
Date	Signature

- -

Formulaire de consentement pour l'Étude environnementale d'échantillonnage dans la région de Belledune

Je, ___________________________ (nom complet en lettres moulées), donne la permission aux techniciens de la compagnie Jacques Whitford d'accéder mon terrain et de prendre des échantillons de terre et de fruits/légumes de jardin pour les faire analyser et pour déterminer leur concentration de plomb et de cadmium.

________________	________________________
date	signature

APPENDIX C

Record of Public Comments

Jacques

Record of Public Comments

The following represents a brief summary of the common issues raised during the public information sessions in Belledune and Petit Rocher.

Comment #1

- Concerns were expressed by a number of people at both meetings that other metals, notably arsenic may also be of concern and questioned why these metals were not included in the study.

Comment #2

- A lack of trust or faith was expressed as well as disappointment that government representatives did not attend the information sessions. There was a desire for a more open, public and transparent process.

Comment #3

- The study should have the participation of a steering committee as well as that of the citizens.

Comment #4

- The scope of the study was too limited in terms of the species being collected (e.g., no scallops), in terms of geography (e.g., clams from Heron Island), and in terms of chemicals (e.g., arsenic).

Comment #5

- If we have no gardens, how can we be included in the study?

Comment #6

- What about the historical consumption?

Comment #7

- Testing for arsenic in the water (wells) would be useful.

Comment #8

- There should be an independent peer review of our sample results as well as the study.

Comment #9

- The government steering committee that is reviewing the study should publish a report.

Jacques

APPENDIX D

Laboratory Analytical Tables

Jacques

Table D.1 Results of Soil Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (mg/kg)	
RB1	QA/QC	< 0.05	< 0.5
RB2	QA/QC	< 0.05	< 0.5
RB3	QA/QC	< 0.05	< 0.5
RB4	QA/QC	< 0.05	< 0.5
RB5	QA/QC	< 0.05	< 0.5
RB6	QA/QC	< 0.05	< 0.5
RB7	QA/QC	< 0.05	< 0.5
NIST 2709A	CRM	0.32	12.2
NIST 2709B	CRM	0.39	17.5
NIST 2709C	CRM	0.35	13.0
NIST 2709D	CRM	0.32	13.4
NIST 2711A	CRM	38.8	1100
NIST 2711B	CRM	40.4	1030
NIST 2711C	CRM	39.0	1090
NIST 2711D	CRM	39.4	1200
52286-04A	SOIL-PV-414	1.02	64.1
52286-04B	Duplicate	1.05	59.0
52286-05	SOIL-PV-404	0.47	42.1
52286-07	SOIL-PR-504	0.60	65.3
52286-08	SOIL-PR-503	0.52	36.9
52286-09	SOIL-PR-6503	0.54	32.9
52286-16	SOIL-PV-413	0.78	48.6
52286-19	SOIL-BD-309	0.57	36.6
52286-20	SOIL-BD-309-2	2.17	131
52286-21	SOIL-BD-309-3	1.25	102
52286-38	SOIL-PV-411	1.83	85.7
52286-48A	SOIL-PR-500	1.33	32.1
52286-48B	Duplicate	1.24	39.0
52286-65	SOIL-PR-506	0.48	35.8
52286-66	SOIL-PR-6506	0.51	33.2
52291-01A	SOIL-PV-409	0.41	37.5
52291-01B	Duplicate	0.41	30.8
52291-02	SOIL-PV-409-2	0.95	35.0
52291-12	SOIL-PV-401	0.54	72.5
52291-15	SOIL-PV-403-1	0.81	46.4
52291-16	SOIL-PV-403-2	0.56	35.4
52291-17	SOIL-PV-6403-2	0.57	26.3
52291-24	SOIL-PV-406	0.64	44.4
52291-25	SOIL-PV-400	1.50	66.3
52291-34	SOIL-PV-405	0.68	30.9
52291-52	SOIL-PV-412 GARDEN1(G1)	0.75	44.7
52291-53	SOIL-PV-412 GARDEN2(G2)	1.23	122
52291-61	SOIL-PV-402-1	0.54	30.0
52291-62	SOIL-PV-402-2	0.62	28.1
52291-69	SOIL-PV-408	1.55	79.8

Table D.1 Results of Soil Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (mg/kg)	
52291-75	SOIL-PV-407	0.97	92.0
52309-08A	SOIL-BD-311	0.77	43.3
52309-08B	Duplicate	0.68	43.4
52309-11	SOIL-BD-300	1.12	79.4
52309-13	SOIL-BD-306	1.03	103
52309-25	SOIL-BD-302	0.76	27.0
52309-35	SOIL-BD-308	1.42	82.1
52309-37	SOIL-BD-304	0.97	117
52309-41	SOIL-BD-303	0.40	89.2
52309-42A	SOIL-BD-310	0.82	62.0
52309-42B	Duplicate	0.89	71.8
52309-43	SOIL-PR-509	0.46	53.7
52309-96	SOIL-PR-510	1.07	151
52309-97	SOIL-PR-511	0.71	56.3
52310-01A	SOIL-LBD-125-1	1.47	115
52310-01B	Duplicate	1.47	130
52310-02	SOIL-LBD-125-2	1.01	138
52310-03	SOIL-LBD-123	0.58	59.5
52310-04	SOIL-LBD-121	1.26	117
52310-05	SOIL-LBD-119	1.10	70.3
52310-06	SOIL-LBD-117-1	2.37	219
52310-07	SOIL-LBD-117-2	1.63	113
52310-08	SOIL-LBD-115	10.2	561
52310-09	SOIL-LBD-113	2.71	179
52310-10	SOIL-LBD-111	3.74	194
52310-11	SOIL-LBD-109	2.16	158
52310-12	SOIL-LBD-105-1	3.14	190
52310-13	SOIL-LBD-105-2	2.17	105
52310-14	SOIL-LBD-100	1.06	75.1
52310-15	SOIL-TS-205-1	2.23	126
52310-16	SOIL-TS-205-2	1.78	112
52310-17	SOIL-TS-200	1.87	138
52310-18	SOIL-TS-202-1	4.19	1290
52310-19	SOIL-TS-202-2	2.33	202
52310-20	SOIL-TS-202-3	2.46	177
52310-21	SOIL-TS-201	1.78	106
52310-22	SOIL-TS-204	1.98	144
52310-23	SOIL-TS-207	1.48	97.8
52310-24	SOIL-TS-250*	1.50	126
52310-25	SOIL-TS-209	2.42	166
52310-26	SOIL-LBD-107	2.35	173
52318-02A	SOIL-PTR-599	0.47	28.2
52318-02B	Duplicate	0.45	27.0
52426-01A	SOIL-TS-216	1.42	104
52426-01B	Duplicate	1.09	82.2

Table D.1 Results of Soil Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (mg/kg)	
52426-02	SOIL-LB-106	2.55	163
52426-03	SOIL-LB-104-1	2.38	130
52426-04	SOIL-LB-104-2	1.82	135
52426-05	SOIL-BD-316	0.69	50.4
52426-06	SOIL-TS-210	1.36	88.1
52426-07	SOIL-TS-212	0.85	53.2
52426-08	SOIL-TS-203	1.74	137
52426-09	SOIL-PR-514	0.53	37.1
52426-10	SOIL-TS-208	1.16	75.2
52426-11	SOIL-TS-206	1.44	128
52523-08A	SOIL-PR-507	0.80	50.8
52523-08B	Duplicate	0.73	49.8
52523-09	SOIL-PR-508	0.71	59.3
52523-10	SOIL-BD-312	0.86	62.7
52523-11	SOIL-BD-301	1.20	73.5
52523-12	SOIL-BD-6303	0.42	110
52523-13	SOIL-BD-305	0.63	28.8
52523-14	SOIL-BD-307	0.43	28.3
52523-15	SOIL-PR-501-1	1.30	77.3
52523-16	SOIL-PR-501-2	0.62	43.2
52523-17	SOIL-PV-410	1.40	91.6
52952-08A	SOIL-PR-505-1	0.78	85.8
52952-08B	Duplicate	0.73	81.5
52952-09	SOIL-PR-505-2	0.55	31.5
52953-14A	SOIL-LBD-150	2.08	136
52953-14B	Duplicate	2.11	140
52953-15	SOIL-LBD-151	1.13	112
52953-25	SOIL-TS-220	0.60	33.0
52953-32	SOIL-TS-220-2	0.50	29.4
52953-33	SOIL-TS-6220	0.46	27.9
52953-47	SOIL-BD-310	0.80	56.8
52953-48	SOIL-BD-6310	0.86	56.3
52953-56	SOIL-BD-351	0.91	47.6
52953-57	SOIL-BD-6351	0.94	52.1

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
RB A	QA/QC	< 0.02	0.2
RB B	QA/QC	< 0.02	0.6
RB C	QA/QC	< 0.02	0.2
RB D	QA/QC	< 0.02	< 0.1
RB E	QA/QC	< 0.02	0.3
RB F	QA/QC	< 0.02	0.3
RB G	QA/QC	0.02	0.1
RB H	QA/QC	< 0.02	< 0.1
RB I	QA/QC	< 0.02	< 0.1
NIST 1575A	CRM	164	10300
NIST 1575B	CRM	144	10600
NIST 1575C	CRM	154	9400
NIST 1575D	CRM	162	9590
NIST 1575E	CRM	158	9770
NIST 1575F	CRM	155	10600
NIST 1575G	CRM	225	10400
NIST 1575H	CRM	138	9870
NIST 1575I	CRM	152	10000
NIST 1575J	CRM	149	9420
NIST 1575K	CRM	140	9870
NIST 1575L	CRM	146	9770
NIST 1575M	CRM	164	10600
NIST 1575N	CRM	162	10500
NIST 1575O	CRM	206	9920
NIST 1575P	CRM	151	11100
NIST 1575Q	CRM	152	11300
NIST 1575R	CRM	156	10800
NIST 1575S	CRM	156	10800
NIST 1575T	CRM	158	10500
NIST 1575U	CRM	163	10200
NIST 1575V	CRM	154	10500
NIST 1575W	CRM	162	10400
NIST 1575X	CRM	155	10600
NIST 1575Y	CRM	151	10800
52309-005	Spike Recovery (%)	86.5	95.3
52309-066	Spike Recovery (%)	99.1	99.5
52310-088	Spike Recovery (%)	85.1	99.8
52523-02	Spike Recovery (%)	93.4	101
52523-19	Spike Recovery (%)	84.2	98.8
52953-07	Spike Recovery (%)	87.4	96.1
52953-35	Spike Recovery (%)	89.2	97.6
52953-74	Spike Recovery (%)	90.3	102
51980-01A	Sunset U-Pick Strawberries	3.78	1.0
51980-01B	Duplicate	3.92	1.1
51980-02	Jemseg Strawberries	1.04	0.9

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
51980-03	Stanley Strawberries	1.38	1.7
51980-04	Sussex Strawberries	1.51	1.7
51980-05	Burton Strawberries	2.54	0.6
51980-06	Stanley Raspberries	5.62	0.7
51980-07	Temperance Vale Raspberries	1.27	0.5
51980-08	Sunset Drive Raspberries	1.27	0.8
51980-09	Maugerville Raspberries	17.2	1.2
52282-01A	CORN-FTN-004	1.65	1.1
52282-01B	Duplicate	1.63	1.5
52282-03A	BEETS-FTN-004	12.0	2.6
52282-03B	Duplicate	12.7	1.9
52282-04	ONIONS-FTN-004	10.2	0.9
52282-05	SQUASH-FTN-004	1.36	1.4
52282-06	RADISH-FTN-004	3.78	1.0
52282-07A	BEANS-FTN-004	0.67	1.6
52282-07B	Duplicate	0.45	0.8
52282-08A	TOMATOES-FTN-004	2.55	0.6
52282-08B	Duplicate	2.48	0.5
52282-09A	CARROTS-FTN-004	20.8	2.9
52282-09B	Duplicate	20.9	3.0
52283-02	TOMATOES-FTN-002	18.6	1.2
52283-03A	CUCUMBER-FTN-002	2.47	1.5
52283-03B	Duplicate	2.81	1.2
52283-04	BEANS-FTN-002	1.96	3.2
52283-05	CORN-FTN-002	9.51	0.8
52283-06	SQUASH-FTN-002	2.78	0.9
52283-07	BEETS-FTN-002	7.85	1.6
52283-08	TURNIP-FTN-002	16.6	1.1
52284-01	APPLES-FTN-001 (Young's Cove)	0.09	3.3
52284-02	CORN-FTN-001 (Young's Cove)	4.30	0.5
52284-04	CUCUMBER-FTN-001 (Young's Cove)	0.97	1.6
52284-05	TOMATOES-FTN-001 (Young's Cove)	12.9	0.8
52284-06	PEAS-FTN-001 (Young's Cove)	4.91	2.3
52284-07	BEANS-FTN-001 (Young's Cove)	2.56	1.5
52284-08	CARROTS-FTN-001 (Young's Cove)	10.9	10.5
52284-09	ONIONS-FTN-001 (Young's Cove)	26.3	3.6
52284-10	BEETS-FTN-001 (Young's Cove)	18.6	1.8
52286-01A	LETTUCE-PV-414	758	126
52286-01B	Duplicate	698	112
52286-02	SPINACH-PV-414	879	113
52286-03	TOMATO-PV-414	40.6	1.1
52286-10	LETTUCE-PV-413	107	79.2
52286-11	SPINACH-PV-413	595	87.4
52286-12	TOMATO-PV-413	5.85	0.9

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52286-13A	PEPPER-PV-413	24.0	1.1
52286-13B	Duplicate	23.6	1.0
52286-14	YELLOW BEANS-PV-413	0.80	4.7
52286-15	CUCUMBER-PV-413	2.44	3.6
52286-18	RASPBERRY-BD-309	4.97	164
52286-23 *	RASPBERRY-BD-310-2	23.3	217
52286-25 *	STRAWBERRY-BD-310	31.1	80.9
52286-26 *	CHERRIES-BD-310	6.72	218
52286-27A *	RHUBARB-BD-310	68.8	50.0
52286-27B *	Duplicate	58.8	36.1
52286-28 *	CRABAPPLES-BD-310	5.64	30.5
52286-29	TOMATO-PV-411	10.7	0.5
52286-30	BEANS-PV-411	1.12	3.0
52286-31	PEPPER-PV-411	24.3	2.6
52286-32	ONIONS-PV-411	22.2	2.2
52286-33	BEETS-PV-411	38.8	7.4
52286-34	TURNIP-PV-411	6.33	1.7
52286-35	CARROTS-PV-411	38.8	12.2
52286-36	CAULIFLOWER-PV-411	10.7	5.2
52286-37	BROCCOLI-PV-411	15.8	4.1
52286-39	RASPBERRY-PR-500	4.68	20.5
52286-40	APPLES-PR-500	1.02	2.6
52286-41	PEAS-PR-500	5.06	3.0
52286-42	TOMATO-PR-500	10.4	0.4
52286-43	BEETS-PR-500	45.0	5.5
52286-44A	ONIONS-PR-500	13.4	1.4
52286-44B	Duplicate	14.1	1.8
52286-45	BEANS-PR-500	0.98	3.6
52286-46A	LETTUCE-PR-500	110	45.2
52286-46B	Duplicate	109	43.2
52286-47	CARROTS-PR-500	46.7	22.0
52286-49	ONION-PR-504	14.2	2.9
52286-50	CUCUMBER-PR-504	2.53	1.6
52286-51	PEPPER-PR-504	17.3	1.1
52286-52	RASPBERRY-PR-504	4.60	60.8
52286-53	TOMATO-PR-504	7.41	0.8
52286-55	TURNIP-PR-504	16.9	6.6
52286-56	BEETS-PR-504	33.9	11.6
52286-57	LETTUCE-PR-504	157	69.6
52286-58	PARSLEY-PR-504	38.6	45.5
52286-59	ONION-PR-506	18.9	3.0
52286-60	CARROTS-PR-506	45.9	12.3
52286-61	TOMATO-PR-506	19.4	0.4
52286-62	CUCUMBER-PR-506	4.89	2.3
52286-63	BEANS-PR-506	1.56	1.8

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52286-64	TURNIP-PR-506	14.3	7.2
52286-67	BEANS-BD-309	1.02	33.1
52291-03	BEANS-PV-409	1.38	9.5
52291-04	PEAS-PV-409	5.19	1.8
52291-05	CUCUMBER-PV-409	4.39	4.8
52291-06	ONIONS-PV-409	43.0	1.3
52291-07	LETTUCE-PV-409	133	67.5
52291-08	LETTUCE-PV-409-2	564	125
52291-09	TOMATO-PV-409-2	13.3	0.8
52291-10	TOMATO-PV-401	11.2	1.3
52291-11	BEANS-PV-401	3.94	10.1
52291-13	HERBS-PV-403-1	128	275
52291-20	CARROTS-PV-406	45.5	10.4
52291-21	ONIONS-PV-406	16.5	2.0
52291-22	BEANS-PV-406	0.73	3.9
52291-23	TOMATO-PV-406	8.76	0.8
52291-26	CARROTS-PV-400	54.3	34.3
52291-27	TOMATO-PV-400	27.0	1.1
52291-28	BASIL-PV-400	35.6	139
52291-29	BEANS-PV-400	1.48	3.8
52291-30	LETTUCE-PV-400	122	63.4
52291-31	PARSLEY-PV-400	73.0	106
52291-32	BEETS-PV-400	25.0	5.8
52291-33	PEAS-PV-400	3.64	11.4
52291-35	CUCUMBER-PV-405	11.5	4.6
52291-36	BEANS-PV-405	4.80	3.5
52291-37	ONIONS-PV-405	26.3	2.5
52291-38	RASPBERRY-PV-405	32.0	89.5
52291-39	LETTUCE-PV-405	102	39.6
52291-40	CARROTS-PV-405	120	32.1
52291-41	TOMATO-PV-405	31.8	0.8
52291-44	ONION-PV-402	14.0	2.2
52291-45	BEANS-PV-402	2.97	2.6
52291-46	APPLES-PV-402	0.53	4.0
52291-47	CUCUMBER-PV-402	4.03	2.0
52291-48A	CABBAGE-PV-402	13.4	9.3
52291-48B	Duplicate	9.66	2.8
52291-49	ZUCCHINI-PV-402	3.45	2.6
52291-50	GREEN PEPPER-PV-402	38.4	3.0
52291-51	TOMATO-PV-402	20.7	0.5
52291-56	BEANS-PV-412	1.71	5.2
52291-57	WATERMELON-PV-402	9.91	1.8
52291-58	BLUEBERRY-PV-402	8.96	143
52291-59	GRAPES-PV-402	0.47	5.4
52291-60	PEARS-PV-402	15.2	7.6

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52291-63	RASPBERRY-PV-402-2	7.23	40.0
52291-64	ONIONS-PV-408	9.14	2.1
52291-65	BEETS-PV-408	12.2	6.2
52291-66	TOMATO-PV-408	10.8	1.8
52291-67	CARROTS-PV-408	25.8	41.3
52291-68	PEAS-PV-408	1.38	6.8
52291-70	ONION-PV-407	35.4	3.5
52291-71	CUCUMBER-PV-407	2.50	2.9
52291-72	LETTUCE-PV-407	220	146
52291-73	RADISH-PV-407	35.0	33.9
52291-74	TOMATO-PV-407	10.7	1.0
52297-01	SQUASH-FTN-003	5.84	4.0
52297-02	CUCUMBER-FTN-003	1.54	1.8
52297-03	BEETS-FTN-003	11.4	1.3
52297-05	BEANS-FTN-003	1.36	0.9
52297-06	CORN-FTN-003	2.74	1.1
52297-07	CARROTS-FTN-003	4.46	4.8
52297-08	ONIONS-FTN-003	1.16	0.5
52299-01	SQUASH-FTN-006	3.03	0.7
52299-02	TURNIP-FTN-006	11.7	0.2
52299-03	PEPPER-FTN-006	13.9	0.6
52299-04	TOMATO-FTN-006	11.7	0.7
52299-05	PEAS-FTN-006	0.86	2.2
52299-06	SPINACH-FTN-006	31.4	18.1
52299-07	CARROTS-FTN-006	6.18	6.0
52299-08	CORN-FTN-006	2.09	1.0
52299-09	CUCUMBER-FTN-006	2.58	1.9
52300-01	SPINACH-FTN-005	64.0	27.9
52300-02	BEANS-FTN-005	0.85	1.6
52300-03	PEPPER-FTN-005	31.8	1.3
52300-04	TOMATO-FTN-005	12.6	0.4
52300-05	BEETS-FTN-005	7.88	1.6
52300-06	PEAS-FTN-005	2.75	3.4
52300-07	CUCUMBER-FTN-005	1.42	0.9
52300-08	RADISH-FTN-005	3.49	1.2
52300-09	CARROTS-FTN-005	75.4	28.7
52300-10	ONION-FTN-005	1.68	1.7
52300-12A	SQUASH-FTN-005	9.52	2.4
52300-12B	Duplicate	9.57	1.4
52300-13	TURNIP-FTN-005	4.13	0.3
52309-001	BEANS-BD-311	4.92	1.9
52309-002	CUCUMBER-BD-311	7.31	2.1
52309-004	TOMATO-BD-311	11.2	0.5
52309-005	GREEN ONION-BD-311	39.5	3.1
52309-006	SQUASH-BD-311	7.96	3.3

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52309-007	RASPBERRY-BD-311	14.1	50.2
52309-009	TOMATO-BD-300	14.8	0.9
52309-010	HERBS-BD-300	35.5	128
52309-012	RHUBARB-BD-306	19.2	74.6
52309-014	BEETS-BD-305	16.2	5.2
52309-015	BEANS-BD-305	1.66	8.8
52309-016	CUCUMBER-BD-305	4.27	1.7
52309-018	CARROTS-BD-305	62.2	10.6
52309-019	LETTUCE-BD-302	31.7	28.7
52309-020	CABBAGE-BD-302	72.0	14.7
52309-021	CORN-BD-302	22.6	1.4
52309-023A	CARROTS-BD-302	23.1	9.3
52309-023B	Duplicate	24.3	11.1
52309-024	BEETS-BD-302	41.0	2.9
52309-026	BEANS-BD-301	1.35	3.9
52309-027	CUCUMBER-BD-301	3.73	2.1
52309-028	PEAS-BD-301	3.04	5.8
52309-029	CARROTS-BD-301	31.4	13.1
52309-030	CUCUMBER-BD-308	3.76	2.5
52309-031	PEAS-BD-308	2.29	5.9
52309-032	BEANS-BD-308	0.72	6.2
52309-033	CARROTS-BD-308	68.5	37.8
52309-034	TOMATO-BD-308	14.7	1.2
52309-036	ZUCCHINI-BD-304	2.00	8.9
52309-038	BEANS-BD-303	1.01	4.0
52309-039	PEAS-BD-303	0.78	2.2
52309-040	TOMATO-BD-303	4.60	0.8
52309-045	BEANS-BD-310	4.00	3.1
52309-046	PEAS-BD-310	3.84	8.3
52309-047	BEETS-BD-310	183	12.2
52309-048	CARROTS-BD-310	150	27.1
52309-049	RADISH-BD-310	38.6	9.4
52309-050	SPINACH-BD-310	1260	349
52309-051	PUMPKIN-BD-310	17.8	4.2
52309-052	CUCUMBER-BD-310	5.20	1.8
52309-053	RASPBERRY-BD-310	89.5	280
52309-055	ONION-BD-312	16.9	5.0
52309-056	BEETS-BD-312	44.3	3.3
52309-057	BEANS-BD-312	2.06	3.4
52309-058	CUCUMBER-BD-312	5.09	2.6
52309-059	LETTUCE-BD-312	197	37.8
52309-060	TOMATO-BD-312	15.8	1.2
52309-061	CABBAGE-BD-312	67.6	7.4
52309-062A	TURNIP-BD-312	27.5	5.4
52309-062B	Duplicate	28.2	6.3

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52309-063	BEETS-PR-509	42.8	16.5
52309-064	CUCUMBER-PR-509	7.30	18.9
52309-065	CORN-PR-509	3.86	1.9
52309-066	BEANS-PR-509	1.26	4.7
52309-067	CARROTS-PR-509	116	22.3
52309-068	TOMATO-PR-509	7.36	1.2
52309-069	PEAS-PR-509	10.9	10.9
52309-071	RASPBERRY-PR-509	5.72	29.0
52309-072	RHUBARB-PR-509	10.9	77.2
52309-074	CORN-PR-508	4.03	2.2
52309-075	CARROTS-PR-508	89.7	40.9
52309-076	CUCUMBER-PR-508	1.88	1.6
52309-077	PEAS-PR-508	3.37	3.1
52309-078	STRAWBERRY-PR-508	5.88	4.4
52309-079A	BEANS-PR-508	4.45	4.5
52309-079B	Duplicate	3.94	4.0
52309-080	BEETS-PR-508	49.8	8.9
52309-081	PUMPKIN-PR-508	1.41	1.6
52309-082	SQUASH-PR-508	12.8	3.8
52309-083	ONION-PR-508	22.7	2.2
52309-084	TOMATO-PR-508	8.36	1.6
52309-085	PEPPER-PR-508	18.9	2.0
52309-088	ONION-PR-510	26.6	5.5
52309-089	BEETS-PR-510	110	64.5
52309-090	PEAS-PR-510	13.6	4.3
52309-091	CARROTS-PR-510	115	57.1
52309-092	TURNIP-PR-510	16.0	17.9
52309-093	BEAN-PR-510	2.04	5.3
52309-094	CUCUMBER-PR-510	6.22	7.3
52309-098	BEAN-PR-511	0.89	11.9
52309-100	CUCUMBER-PR-511	3.53	2.9
52310-027A	RASPBERRY-LBD-125-1	24.9	67.9
52310-027B	Duplicate	23.3	37.7
52310-029	STRAWBERRY-LBD-125-2	19.2	31.1
52310-030	ONION-LBD-125-2	46.2	12.5
52310-031	CUCUMBER-LBD-125-2	9.21	10.3
52310-032	SWISS CHARD-LBD-125-2	338	324
52310-033	TOMATO-LBD-125-2	27.3	1.2
52310-034	ZUCCHINI-LBD-125-2	2.97	1.4
52310-035	BEAN-LBD-125-2	1.09	8.4
52310-036	BEET-LBD-125-2	65.6	26.7
52310-037	RED ONION-LBD-125-2	32.7	11.7
52310-038	CHERRY TOMATO-LBD-123	32.5	3.7
52310-039	TOMATO-LBD-123	18.2	5.2

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52310-040A	CUCUMBER-LBD-123	9.65	7.5
52310-040B	Duplicate	9.76	7.8
52310-041	CARROT-LBD-123	171	95.1
52310-042	GREEN BEAN-LBD-123	8.64	7.0
52310-043	YELLOW BEAN-LBD-123	5.06	11.6
52310-044	ONION-LBD-123	50.1	12.6
52310-046	RASPBERRY-LBD-119	12.7	147
52310-047	RASPBERRY-LBD-117-1	16.4	166
52310-048	GOOSEBERRY-LBD-117-1	4.98	221
52310-049	RHUBARB-LBD-113	67.2	515
52310-050	GOOSEBERRY-LBD-113	5.09	104
52310-051	RHUBARB-LBD-111	57.2	86.4
52310-052	TURNIP-LBD-109	19.7	8.4
52310-053	CARROT-LBD-109	113	51.8
52310-054	TOMATO-LBD-109	19.5	1.8
52310-055	ZUCCHINI-LBD-109	8.52	7.6
52310-056	BEET-LBD-109	76.8	35.9
52310-057	CUCUMBER-LBD-109	12.2	12.0
52310-059	CHARD-LBD-109	315	699
52310-060	RED ONION-LBD-109	23.2	7.3
52310-061	GREEN BEAN-LBD-109	2.67	23.7
52310-062	YELLOW BEAN-LBD-109	1.98	14.2
52310-063	PEAS-LBD-109	11.8	19.7
52310-064	STRAWBERRY-LBD-109	6.44	92.7
52310-065	ONION-LBD-109	56.2	9.9
52310-066	BEET-LBD-105-1	131	44.4
52310-067	PEAS-LBD-105-1	3.86	32.5
52310-068	ONION-LBD-105-1	46.2	8.8
52310-069	RADISH-LBD-105-1	44.4	32.1
52310-070	CUCUMBER-LBD-105-1	11.7	5.8
52310-071	TOMATO-LBD-105-1	31.6	1.5
52310-072	CARROT-LBD-105-1	224	225
52310-074	BEAN-LBD-105-1	2.97	10.8
52310-075	STRAWBERRY-LBD-105-2	29.2	47.3
52310-076	CRABAPPLE-LBD-105-2	1.33	20.0
52310-077	ONION-LBD-100	84.6	3.6
52310-079	BEET-LBD-100	82.4	32.4
52310-080	CUCUMBER-LBD-100	11.8	6.9
52310-081	RASPBERRY-TS-205-1	17.8	54.3
52310-082	RHUBARB-TS-205-1	48.3	314
52310-083	CORN-TS-202-1	64.2	5.2
52310-085	TURNIP-TS-202-2	11.6	8.1
52310-086	BEAN-TS-202-2	2.22	17.2
52310-087	CARROT-TS-202-2	165	59.9
52310-088	ONION-TS-202-2	45.2	2.9

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52310-089	TOMATO-TS-202-3	19.6	0.9
52310-090	LETTUCE-TS-202-3	377	416
52310-091	BROCCOLI-TS-202-3	8.54	14.5
52310-092	BEET-TS-202-3	49.4	25.8
52310-093	PEAS-TS-201	3.54	10.5
52310-094	TOMATO-TS-201	33.7	1.1
52310-095	PARSNIP-TS-204	31.8	84.7
52310-096	TOMATO-TS-204	10.5	0.6
52310-097	CARROT-TS-204	39.2	29.4
52310-098	SHELL PEA-TS-204	2.68	11.1
52310-099	SNOW PEA-TS-204	0.80	5.6
52310-100	ONION-TS-204	15.9	6.2
52310-101	CUCUMBER-TS-204	5.70	4.7
52310-102	DILL-TS-204	157	61.8
52310-103	GREEN PEPPER-TS-204	23.8	2.6
52310-105	RHUBARB-TS-207	54.8	233
52310-106	TOMATO-TS-207	33.5	1.0
52310-107	BEAN-TS-207	0.89	6.2
52310-108	PEAS-TS-207	1.67	3.6
52310-109	RHUBARB-LBD-107	70.3	287
52318-01	RASBERRY-PTR-599	7.72	15.5
52426-12	CARROT-LB-104	186	291
52426-13	CARROT-TS-208	337	373
52426-14	CARROT-BD-316	44.6	19.7
52426-15	CARROT-PR-514	53.2	12.5
52426-16	CUCUMBER-BD-316	5.83	1.2
52426-17	CUCUMBER-PR-514	2.86	1.4
52426-18	APPLE-TS-208	4.26	12.1
52426-19	APPLE-TS-6206	3.62	13.0
52426-20	APPLE-TS-206	5.04	11.3
52426-21	BEET-PR-514	55.8	6.0
52426-22	BEET-PR-6514	113	16.1
52426-23	BEET-BD-316	20.8	5.9
52426-24	BEET-LB-104	237	104
52426-25	RHUBARB-BD-6316	10.5	7.5
52426-26	RHUBARB-BD-316	5.80	2.9
52426-27	RHUBARB-LB-106	106	726
52426-28	RHUBARB-LB-6106	134	2100
52426-29	RHUBARB-PR-514	24.9	23.3
52426-30	RHUBARB-TS-203	229	179
52426-31	BEANS-BD-316	1.46	1.7
52426-32	BEANS-BD-6316	1.37	3.6
52426-33	BEANS-LB-104	7.69	5.3
52426-34	BEANS-LB-6104	6.55	8.2
52426-35	BEANS-TS-208	14.8	18.4

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52426-36	STRAWBERRY-TS-208	52.5	170
52426-37	RASPBERRY-LB-104	27.3	556
52426-38	RASPBERRY-TS-208	22.1	232
52426-40	PEPPER-PR-514	70.9	2.9
52426-41	SWISS CHARD-BD-6316	63.8	17.8
52426-42	SWISS CHARD-BD-316	46.3	18.1
52426-43	TOMATO-BD-6316	14.4	0.6
52426-44	TOMATO-BD-316	9.75	0.5
52426-45	TOMATO-TS-208	53.4	1.2
52426-46	TOMATO-TS-6208	46.0	1.7
52426-47	TOMATO-PR-6514	10.6	0.5
52426-48	TOMATO-PR-514	15.0	0.8
52426-49A	ONION-TS-208	157	20.2
52426-49B	Duplicate	150	19.9
52426-50	ONION-TS-6208	110	6.8
52426-51	ONION-TS-206	267	37.7
52426-52	ONION-PR-514	36.0	3.0
52426-53	ONION-LB-104	22.0	9.5
52505-01	RHUBARB-TS-208	84.3	144
52523-01	PEAS-PR-507	3.97	1.8
52523-02A	TOMATO-PR-507	16.7	3.9
52523-02B	Duplicate	15.0	0.3
52523-03	ONION-PR-507	14.8	3.0
52523-04	CUCUMBER-PR-507	2.50	4.4
52523-06	LETTUCE-PR-507	4.73	1.8
52523-07	YELLOW BEAN-PR-507	2.06	2.6
52523-18	BEETS-TS-204	17.0	65.1
52523-19A	STRAWBERRY-TS-204	1.84	20.6
52523-19B	Duplicate	1.79	21.9
52523-20	RASPBERRY-LBD-109	52.4	1620
52523-21	BEANS-BD-304	0.36	2.2
52523-22	CARROTS-BD-304	17.8	30.0
52523-24	APPLES-BD-304	0.30	2.0
52523-25	GOOSEBERRY-BD-304	1.78	23.7
52523-26	CURRANTS-BD-304	8.55	76.2
52523-27	ONION-BD-304	11.3	8.6
52523-28	GRAPES-BD-304	0.32	3.1
52523-29	BEETS-BD-304	30.3	27.9
52523-30	CUCUMBER-BD-307	1.58	1.0
52523-31	YELLOW BEAN-BD-307	0.92	2.8
52523-32	PEAS-BD-307	0.81	2.9
52523-33	TOMATO-BD-307	15.3	0.6
52523-34	ONION-PR-509	47.7	6.2
52523-35	SHALLOT-PR-509	65.4	8.0
52523-36	PEPPER-PR-509	28.5	1.6

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52523-37	ONION-BD-310	24.2	4.5
52523-38	LETTUCE-BD-310	283	135
52523-39	RASPBERRY-PR-501	41.1	8.5
52523-40	GRAPE-PR-501	1.11	2.7
52523-41	BLUEBERRY-PR-501	2.06	6.0
52523-42	HERBS-PR-501	610	101
52523-43	BEETS-PR-501	108	49.6
52523-44	SQUASH-PR-500	3.83	2.1
52523-45	RHUBARB-PR-500	25.2	44.0
52523-47	RADISH-PR-504	7.70	2.6
52523-48	CARROTS-PR-505	39.9	28.2
52523-49	ONION-PR-505	22.6	3.7
52523-50	TOMATO-PR-505	6.70	0.3
52523-51	WHEAT-PR-505	4.11	53.9
52523-52	YELLOW BEAN-PR-505-2	1.61	1.4
52523-53	CARROTS-PR-505-2	101	14.6
52523-54	CUCUMBER-PR-505-2	1.86	1.4
52523-55	CABBAGE-PR-505-2	1.06	6.7
52952-01	CUCUMBER-PV-410	18.0	10.0
52952-02	YELLOW BEAN-PR-505	1.03	4.6
52952-03	TOMATO-PV-410	29.0	2.2
52952-04	CUCUMBER-PV-411	3.19	4.2
52952-05	SHALLOT-PV-413	7.65	4.2
52952-06	TOMATO-PR-505-2	12.8	0.3
52952-07	ONION-PR-505-2	36.1	1.3
52952-10	CUCUMBER-PR-505	6.31	6.7
52952-11	YELLOW BEAN-PV-410	0.85	4.3
52953-01A	BEAN-LBD-6100	7.44	16.3
52953-01B	Duplicate	7.78	16.0
52953-02	BEAN-LBD-100	5.36	10.0
52953-03	TOMATO-LBD-100	22.8	1.7
52953-04	CHIVES-LBD-104	94.9	527
52953-05	ARTICHOKE-LBD-104	16.7	8.3
52953-06	CORN-LBD-109	57.8	1.1
52953-07	SQUASH-LBD-109	6.84	13.9
52953-08	CHERRY TOMATO-LBD-109	27.3	3.5
52953-09	PEPPER-LBD-109	51.0	5.2
52953-10A	GRAPE-LBD-125	1.40	18.6
52953-10B	Duplicate	1.40	19.9
52953-11	APPLES-LBD-125	0.62	6.0
52953-12	CUCUMBER-LBD-150	5.87	9.4
52953-13	TOMATO-LBD-150	20.0	1.7
52953-16	CRABAPPLE-LBD-151	1.23	13.7
52953-17	BEAN-TS-201	4.46	10.6
52953-18	SQUASH-TS-201	9.26	9.5

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52953-19	CELERY-TS-204	20.6	29.6
52953-20	BEAN-TS-204	2.56	5.3
52953-21	BEAN-TS-6204	8.91	8.2
52953-22	CUCUMBER-TS-206	7.58	14.1
52953-23	PEPPER-TS-207	97.7	3.0
52953-24	SUNFLOWER-TS-203	59.1	6.5
52953-26	RUTABAGA-TS-220	10.3	1.2
52953-27	CABBAGE-TS-220	6.20	0.4
52953-28	CORN-TS-6220	4.12	1.2
52953-29	CORN-TS-220	3.67	1.0
52953-30	BROCCOLI-TS-220	17.3	2.8
52953-31	TOMATO-TS-220	35.6	0.5
52953-34	RUTABAGA-TS-220-2	12.1	1.3
52953-35	CABBAGE-TS-220-2	6.17	0.4
52953-36	BEAN-TS-250	30.3	68.2
52953-37	CUCUMBER-TS-250	9.66	7.8
52953-38	PUMPKIN-BD-300	1.31	1.5
52953-39	ZUCCHINI-BD-6301	1.59	3.0
52953-40	ZUCCHINI-BD-301	1.49	2.7
52953-41	SQUASH-BD-301	1.40	5.0
52953-42	CORN-BD-301	6.10	0.7
52953-43	CUCUMBER-BD-303	1.51	8.6
52953-44	PUMPKIN-BD-309	3.20	1.9
52953-45	BEAN-BD-309	4.26	30.5
52953-46	LETTUCE-BD-309	91.8	262
52953-49A	BASIL-BD-311	79.9	95.2
52953-49B	Duplicate	71.2	84.4
52953-50	BEAN-BD-351	9.04	8.8
52953-51	BEAN-BD-6351	9.04	8.4
52953-52	BEETS-BD-351	269	28.8
52953-53	ONION-BD-351	384	13.9
52953-54	CUCUMBER-BD-351	32.1	8.3
52953-55	TOMATO-BD-351	26.1	0.6
52953-58	CUCUMBER-PV-400	6.40	1.5
52953-59	CUCUMBER-PV-401	3.79	10.0
52953-60	PLUMS-PV-402	1.21	79.2
52953-61	CORN-PV-402	10.8	0.8
52953-62	CUCUMBER-PV-403	5.01	2.5
52953-65	CUCUMBER-PV-406	5.17	2.3
52953-66	CUCUMBER-PV-408	1.00	2.0
52953-67	SQUASH-PV-409	8.05	2.4
52953-68	SPINACH-PV-409	646	134
52953-69	CUCUMBER-PV-412	1.44	2.9
52953-70	CUCUMBER-PR-500	4.82	1.5
52953-71	CUCUMBER-PR-501	5.11	3.3

Table D.2 Results of Produce Samples (Excluding Potato)

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52953-72	BEAN-PR-504	0.48	3.4
52953-73	BEAN-PR-6504	9.13	7.5
52953-74	CARROTS-PR-504	66.7	41.0
52953-76	BEETS-PR-506	27.6	1.8
52953-77	TURNIP-PR-509	4.96	4.1
52953-78	CORN-PR-510	7.90	1.2
52953-79	CORN-PR-514	1.68	0.6
53222-01	TURNIP-FTN-1000	4.20	0.6
53222-02	APPLES-FTN-1000	0.21	1.9
53222-03	GREEN PEPPER-FTN-1000	15.0	1.2
53222-04	RADISH-FTN-1000	4.06	1.4
53222-05	SWISS CHARD-FTN-1000	12.2	11.0
53222-06	LETTUCE-FTN-1000	148	59.4
53222-07	PEAS-FTN-1000	1.49	1.3
53222-08	ROMAINE LETTUCE-FTN-1000	60.2	14.8
53222-09A	PEAS-FTN-2000	3.07	2.9
53222-09B	Duplicate	3.09	2.0
53222-10A	RADISH-FTN-2000	5.36	1.8
53222-10B	Duplicate	5.81	1.8
53222-11	APPLES-FTN-3000	0.22	0.8
53222-12	GREEN PEPPER-FTN-3000	12.0	0.8
53222-13A	APPLES-FTN-4000	0.11	0.5
53222-13B	Duplicate	0.13	0.5
53222-14	GREEN PEPPER-FTN-4000	18.6	3.0
53222-15	TURNIP-FTN-4000	2.49	0.6
53222-16	LETTUCE-FTN-4000	5.73	1.0
53222-17	ROMAINE LETTUCE-FTN-61000	49.4	17.3
53222-18	LETTUCE-FTN-64000	5.51	2.5

* Note: Sample was analyzed as usual. Produce was frozen and packaged by homeowner. Leak occurred during transit to lab. Result may be compromised.

Table D.3 Results of Potato Samples

RPC ID	Client ID	Cadmium	Lead	Mass
		Concentration (ng/g)		(g)
RB J	QA/QC	0.04	< 0.1	-
RB K	QA/QC	< 0.02	< 0.1	-
RB L	QA/QC	0.04	< 0.1	-
RB M	QA/QC	0.04	< 0.1	-
NIST 1575Z	CRM	149	9700	-
NIST 1575AA	CRM	144	9930	-
NIST 1575AB	CRM	154	10100	-
NIST 1575AC	CRM	149	9820	-
NIST 1575AD	CRM	151	10000	-
NIST 1575AE	CRM	144	9960	-
NIST 1575AF	CRM	258	10600	-
NIST 1575AG	CRM	150	10500	-
NIST 1575AH	CRM	318	10400	-
NIST 1575AI	CRM	133	9910	-
52282-02	Spike Recovery (%)	84.6	94.0	-
52282-02 (Peel)	Spike Recovery (%)	75.7	97.9	-
52953-75	Spike Recovery (%)	92.2	100	-
52953-75 (Peel)	Spike Recovery (%)	89.8	106	-
52282-02A	POTATO-FTN-004	30.4	0.5	308.27
52282-02B	Duplicate	29.4	0.2	-
52282-02A (Peel)	POTATO-FTN-004 (Peel)	42.9	9.3	73.36
52282-02B (Peel)	Duplicate (Peel)	43.9	9.0	-
52283-01	POTATO-FTN-002	26.3	0.5	216.59
52283-01 (Peel)	POTATO-FTN-002 (Peel)	43.6	9.9	38.7
52284-03	POTATO-FTN-001 (Young's Cove)	40.2	7.9	115.71
52284-03 (Peel)	POTATO-FTN-001 (Young's Cove) (Peel)	67.4	6.7	41.87
52286-24	POTATO-BD-309	22.1	1.4	143.81
52286-24 (Peel)	POTATO-BD-309 (Peel)	29.4	20.7	91.68
52286-54	POTATO-PR-504	27.4	2.3	263.24
52286-54 (Peel)	POTATO-PR-504 (Peel)	33.5	18.1	72.83
52291-14	POTATO-PV-403-2	50.3	5.2	60.01
52291-14 (Peel)	POTATO-PV-403-2 (Peel)	71.3	23.5	36.44
52291-18	POTATO-PV-406 (WHITE)	13.2	1.0	487.21
52291-18 (Peel)	POTATO-PV-406 (WHITE) (Peel)	18.3	15.1	141.61
52291-19	POTATO-PV-406 (RED)	12.3	1.1	259.61
52291-19 (Peel)	POTATO-PV-406 (RED) (Peel)	15.9	11.4	108.67
52291-42	POTATO-PV-402-1	20.1	2.7	127.11
52291-42 (Peel)	POTATO-PV-402-1 (Peel)	38.2	24.2	39.42
52291-43	POTATO-PV-402-2	13.2	1.4	62.8
52291-43 (Peel)	POTATO-PV-402-2 (Peel)	23.5	52.8	45.32
52291-54	POTATO-PV-412 GARDEN1	66.0	3.5	182.81
52291-54 (Peel)	POTATO-PV-412 GARDEN1 (Peel)	75.9	33.2	99.43
52291-55	POTATO-PV-412 GARDEN2	57.7	2.7	321.06
52291-55 (Peel)	POTATO-PV-412 GARDEN2 (Peel)	69.4	54.5	146.06
52297-04	POTATO-FTN-003	14.0	0.9	187.37

Table D.3 Results of Potato Samples

RPC ID	Client ID	Cadmium	Lead	Mass
		Concentration (ng/g)		(g)
52297-04 (Peel)	POTATO-FTN-003 (Peel)	24.6	11.1	35.45
52300-11	POTATO-FTN-005	31.3	0.2	159.62
52300-11 (Peel)	POTATO-FTN-005 (Peel)	52.4	11.7	57.06
52309-022	POTATO-BD-302	18.3	0.7	285.56
52309-022 (Peel)	POTATO-BD-302 (Peel)	23.1	4.6	38.2
52309-044	POTATO-BD-310	44.0	2.8	507.33
52309-044 (Peel)	POTATO-BD-310 (Peel)	54.0	14.7	153.9
52309-054	POTATO-BD-312	54.0	2.4	195.13
52309-054 (Peel)	POTATO-BD-312 (Peel)	69.7	84.8	66.85
52309-070	POTATO-PR-509	33.9	0.9	273.13
52309-070 (Peel)	POTATO-PR-509 (Peel)	41.3	26.8	84.56
52309-073	POTATO-PR-508	53.9	0.6	194.35
52309-073 (Peel)	POTATO-PR-508 (Peel)	19.0	22.4	69.07
52309-087	POTATO-PR-510	31.8	2.6	196.78
52309-087 (Peel)	POTATO-PR-510 (Peel)	46.5	141	80.13
52309-099	POTATO-PR-511	30.9	1.1	201.67
52309-099 (Peel)	POTATO-PR-511 (Peel)	35.6	5.8	34.96
52310-028	POTATO-LBD-125-2	121	12.0	399.4
52310-028 (Peel)	POTATO-LBD-125-2 (Peel)	41.5	24.2	82.14
52310-045	POTATO-LBD-123	57.6	5.3	200.89
52310-045 (Peel)	POTATO-LBD-123 (Peel)	69.2	18.4	90
52310-058	POTATO-LBD-109	31.3	8.2	182.91
52310-058 (Peel)	POTATO-LBD-109 (Peel)	162	45.4	93.41
52310-073	POTATO-LBD-105-1	16.0	2.4	109.67
52310-073 (Peel)	POTATO-LBD-105-1 (Peel)	66.0	6.4	71.82
52310-078	POTATO-LBD-100	47.1	5.0	194.2
52310-078 (Peel)	POTATO-LBD-100 (Peel)	56.8	18.0	108.64
52310-084	POTATO-TS-202-2	63.9	8.5	198.76
52310-084 (Peel)	POTATO-TS-202-2 (Peel)	84.2	97.0	71.01
52426-39	POTATO-LB-104	12.0	6.0	58.71
52426-39 (Peel)	POTATO-LB-104 (Peel)	19.4	30.1	35.92
52523-05	POTATO-PR-507	28.5	0.8	363.68
52523-05 (Peel)	POTATO-PR-507 (Peel)	32.4	6.2	99.46
52523-23	POTATO-BD-304	12.6	1.3	423.17
52523-23 (Peel)	POTATO-BD-304 (Peel)	14.3	18.3	132.72
52523-46	POTATO-PR-503	47.6	1.1	383.37
52523-46 (Peel)	POTATO-PR-503 (Peel)	60.2	15.4	120.86
52953-63	POTATO-PV-404	41.2	14.5	39.4
52953-63 (Peel)	POTATO-PV-404 (Peel)	45.7	13.2	17.5
52953-64	POTATO-PV-6404	50.2	5.7	33.61
52953-64 (Peel)	POTATO-PV-6404 (Peel)	53.4	7.0	14.81
52953-75A	POTATO-PR-506	29.6	1.7	166.85
52953-75B	Duplicate	28.8	1.8	-
52953-75A (Peel)	POTATO-PR-506 (Peel)	49.5	20.9	36.47
52953-75B (Peel)	Duplicate (Peel)	45.0	21.4	-

Table D.4 Results of Finfish and Bivalve Mollusks

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
RB N	QA/QC	< 0.02	< 0.1
RB O	QA/QC	< 0.02	< 0.1
RB P	QA/QC	< 0.02	0.2
DORM-2A	CRM	36.4	58.3
DORM-2B	CRM	35.9	51.2
DORM-2C	CRM	37.1	58.3
DORM-2D	CRM	38.1	54.1
DORM-2E	CRM	36.0	49.4
DORM-2F	CRM	36.4	50.1
DORM-2G	CRM	39.4	44.1
NIST 1566A	CRM	2160	275
NIST 1566B	CRM	2150	275
NIST 2976A	CRM	708	1170
NIST 2976B	CRM	724	2140
53143-42	Spike Recovery (%)	76.2	99.9
52562-05	Spike Recovery (%)	86.1	116
52953-93	Spike Recovery (%)	92.7	100
52143-01A	MACKEREL-BD-000-1	17.2	22.0
52143-01B	Duplicate	14.7	19.2
52143-02	MACKEREL-BD-000-2	8.81	2.6
52143-03	MACKEREL-BD-000-3	12.1	6.7
52143-04	MACKEREL-BD-000-4	11.5	2.2
52143-05	MACKEREL-BD-000-5	60.4	4.6
52143-06	MACKEREL-BD-000-6	10.4	4.0
52143-07	MACKEREL-BD-000-7	17.6	36.8
52143-08	MACKEREL-BD-000-8	8.30	2.6
52143-09	MACKEREL-BD-000-9	6.06	9.0
52143-10	MACKEREL-BD-000-10	18.4	3.9
52143-11	MACKEREL-BD-6000-11	7.09	12.3
52143-12	MACKEREL-BDI-000-1	22.8	11.9
52143-13	MACKEREL-BDI-000-2	7.71	6.9
52143-14	MACKEREL-BDI-000-3	6.71	1.4
52143-15	MACKEREL-BDI-000-4	6.25	2.6
52143-16	MACKEREL-BDI-000-5	9.48	1.9
52143-17	MACKEREL-BDI-000-6	31.6	3.1
52143-18	MACKEREL-BDI-000-7	3.54	2.2
52143-19	MACKEREL-BDI-000-8	17.8	3.1
52143-20	MACKEREL-BDI-000-9	3.59	1.0
52143-21A	MACKEREL-BDI-000-10	5.95	1.1
52143-21B	Duplicate	16.4	1.5
52143-22	MACKEREL-BDI-6000-11	24.8	2.4
52143-23	MACKEREL-LBD-000-1	8.22	3.4
52143-24	MACKEREL-LBD-000-2	21.6	6.1
52143-25	MACKEREL-LBD-000-3	11.0	4.7
52143-26	MACKEREL-LBD-000-4	14.0	2.6

Table D.4 Results of Finfish and Bivalve Mollusks

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52143-27	MACKEREL-LBD-000-5	11.9	2.3
52143-28	MACKEREL-LBD-000-6	17.6	1.9
52143-29	MACKEREL-LBD-000-7	31.8	6.5
52143-30	MACKEREL-LBD-000-8	17.5	2.0
52143-31	MACKEREL-LBD-000-9	6.47	2.5
52143-32	MACKEREL-LBD-000-10	22.4	5.8
52143-33	MACKEREL-LBD-6000-11	16.5	1.8
52143-34	MACKEREL-PV-000-1	22.4	4.0
52143-35	MACKEREL-PV-000-2	20.0	4.6
52143-36	MACKEREL-PV-000-3	9.98	11.2
52143-37	MACKEREL-PV-000-4	26.2	6.1
52143-38	MACKEREL-PV-000-5	31.4	7.2
52143-39	MACKEREL-PV-000-6	3.27	1.4
52143-40	MACKEREL-PV-000-7	12.0	3.5
52143-41	MACKEREL-PV-000-8	19.4	3.7
52143-42	MACKEREL-PV-000-9	37.5	7.0
52143-43	MACKEREL-PV-000-10	13.1	3.2
52143-44	MACKEREL-PV-6000-11	20.1	3.2
52143-45	MACKEREL-PTR-000-1	10.0	2.5
52143-46	MACKEREL-PTR-000-2	24.0	2.2
52143-47	MACKEREL-PTR-000-3	12.3	4.1
52143-48	MACKEREL-PTR-000-4	15.8	2.6
52143-49	MACKEREL-PTR-000-5	9.95	2.2
52143-50	MACKEREL-PTR-000-6	52.2	7.2
52143-51	MACKEREL-PTR-000-7	9.03	10.5
52143-52	MACKEREL-PTR-000-8	5.01	1.1
52143-53	MACKEREL-PTR-000-9	18.7	3.5
52143-54	MACKEREL-PTR-000-10	13.8	5.2
52143-55	MACKEREL-PTR-6000-11	6.58	3.9
52286-06	MACKEREL-PR-500	2.18	4.3
52318-03A	SMELT-BD-000-5	8.07	11.8
52318-03B	Duplicate	5.72	17.1
52318-04	SMELT-BD-000-6	11.8	14.7
52318-05	SMELT-BD-000-7	11.5	20.6
52318-06	SMELT-BD-000-8	13.9	12.3
52318-07	SMELT-BD-000-9	8.96	21.6
52562-01A	TROUT-PV-005-2	11.3	38.3
52562-01B	Duplicate	12.1	32.0
52562-02	TROUT-PV-005-3	12.6	133
52562-03	TROUT-PV-005-4	17.0	25.0
52562-04	TROUT-PV-005-5	27.6	62.0
52562-05	TROUT-PV-005-6	57.0	247
52562-06	TROUT-BD-002-1	14.8	16.9
52562-07	TROUT-BD-002-2	19.0	33.7
52562-08	TROUT-BD-002-3	8.10	12.7

Table D.4 Results of Finfish and Bivalve Mollusks

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52562-09	TROUT-BD-002-4	18.7	61.8
52562-10	TROUT-BD-002-5	8.68	16.4
52562-11	TROUT-BD-002-6	16.9	17.4
52562-12	TROUT-BD-002-7	22.3	23.5
52562-13	TROUT-BD-002-8	19.2	17.8
52562-14	TROUT-BD-002-9	29.1	23.0
52562-15	TROUT-BD-002-10	43.6	54.7
52562-16	TROUT-BD-6002-11	11.9	27.7
52562-17	MUSSEL-PV-000-1	834	7920
52562-18	MUSSEL-PV-000-2	884	7420
52562-19	MUSSEL-PV-000-3	936	6580
52562-20	MUSSEL-PV-000-4	722	9420
52562-21	MUSSEL-PV-000-5	680	2840
52562-22	MUSSEL-PV-000-6	772	13500
52562-23	MUSSEL-PTR-000-1	510	1140
52562-24	MUSSEL-PTR-000-2	441	935
52562-25	MUSSEL-PTR-000-3	665	2000
52562-26	MUSSEL-PTR-000-4	595	1900
52562-27	MUSSEL-PTR-000-5	685	2240
52562-28A	MUSSEL-PTR-000-6	515	925
52562-28B	Duplicate	625	1780
52562-29	MUSSEL-LBD2-000-1	1280	30200
52562-30	MUSSEL-LBD2-000-2	1640	24800
52562-31	MUSSEL-LBD2-000-3	1190	18000
52562-32	MUSSEL-LBD2-000-4	1090	17300
52562-33	MUSSEL-LBD2-000-5	1110	12700
52562-34	MUSSEL-LBD2-000-6	1690	12400
52564-01	CLAM-BD-000-01	148	3740
52564-02	CLAM-BD-000-02	101	2300
52564-03	CLAM-BD-000-03	62.5	1380
52564-04	CLAM-BD-000-04	76.0	1350
52564-05	CLAM-BD-000-05	61.5	1420
52564-06	CLAM-BD-6000-06	91.5	1810
52564-07	MUSSEL-BD-000-06	670	4310
52564-08	MUSSEL-LBD-000-06	2030	32800
52579-01	MUSSEL-BD-000-1	1510	24600
52579-02	MUSSEL-BD-000-2	565	2130
52579-03	MUSSEL-BD-000-3	675	3590
52579-04	MUSSEL-BD-000-4	691	3920
52579-05	MUSSEL-BD-000-5	1770	25900
52579-06	MUSSEL-LBD-000-1	510	1730
52579-07	MUSSEL-LBD-000-2	3040	124000
52579-08	MUSSEL-LBD-000-3	1850	20200
52579-09	MUSSEL-LBD-000-4	1820	51200
52579-10	MUSSEL-LBD-000-5	534	4180

Table D.4 Results of Finfish and Bivalve Mollusks

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52579-11	TROUT-PV-005-1	6.69	7.9
52579-12	SMELT-BD-000-1	4.25	6.9
52579-13	SMELT-BD-000-2	8.34	9.1
52579-14	SMELT-BD-000-3	4.46	7.3
52579-15	SMELT-000-4	30.0	26.2
52953-80	TROUT-PV-005-7	36.9	67.5
52953-81	TROUT-PV-005-8	65.8	68.7
52953-82	TROUT-PV-005-9	182	308
52953-83	TROUT-PV-005-10	50.4	130
52953-84	TROUT-PV-005-11	63.9	103
52953-85	TROUT-PTR-006-1	22.9	181
52953-86	TROUT-PTR-006-2	28.7	31.2
52953-87A	TROUT-PTR-006-3	31.9	49.3
52953-87B	Duplicate	27.0	66.6
52953-88	TROUT-PTR-006-4	66.1	115
52953-89	TROUT-PTR-006-5	88.3	57.7
52953-90	TROUT-PTR-006-6	55.6	80.3
52953-91	TROUT-PTR-006-7	68.1	110
52953-92	TROUT-PTR-006-8	19.3	70.1
52953-93	TROUT-PTR-006-9	60.6	66.1
52953-94	TROUT-PTR-006-10	17.2	40.8
52953-95	TROUT-PTR-006-11	79.6	49.7
52953-96	SMELT-BD-351	25.1	81.9
52953-97	SMELT-BD-303	16.9	75.3
52953-98	SMELT-PV-402	25.5	34.6
52953-99	SMELT-PR-504	4.72	42.2

APPENDIX E

Laboratory Certificates

Jacques

RPC
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November 07, 2005
Revised: December 06, 2005

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DEC 13 2005

Lead and Cadmium Analysis

Analysis Description

A total of 801 samples of soil, fruits, vegetables, fish and shellfish were analyzed for lead and cadmium. This analysis report includes analytical results for all samples, 23 reagent blanks, 54 samples of certified reference materials, 15 laboratory fortified replicate samples and 47 analytical duplicates. QA/QC samples were prepared and analyzed concurrently with the samples. For the laboratory fortified (spiked) samples, a standard solution containing the target elements was added to a weighed subsample of the homogenate prior to digestion and analysis.

All analyses were performed using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) on appropriately prepared digests of sample homogenates.

The analysis contract provided for the analysis of samples for lead and cadmium. In addition to these two elements, data was also collected for a number of other trace elements of environmental concern.

Initial Sample Preparation

Soil samples were air-dried at ~30 °C and sieved at 1mm to remove rocks, gravel and large pieces of vegetative matter. The dried, sieved sample portions were homogenized prior to subsampling for analysis.

A variety of initial sample preparation procedures were carried out on the remaining samples. These procedures were developed in discussion with JWEL staff. After decontamination of the various tissue specimens, the samples were homogenized by grating of the fresh sample, grating of a frozen sample portion, chopping with a stainless steel knife, or simple physical blending of soft fruits.

It should be noted that the sample surface decontamination procedures were not based upon removal of 100% of any possible extraneous sources of trace elements but were designed to reasonably simulate how the sample might be handled during the course of careful food preparation prior to consumption. For example, loose dirt was removed with a soft-bristled brush and the sample was rinsed under a stream of running (distilled) water for vegetables/fruits that are not normally peeled.

Similarly, the analytical samples consisted of the portions of the food product that are normally consumed. For example, a watermelon sample would not include the skin/rind and corn would include only the kernels but an apple would be homogenized with skin-on. Potato flesh and (scrubbed) peel were prepared and analyzed separately.

The second "tab" of this Excel "workbook" includes the sample preparation protocol supplied by JWEL.

Sample Digestion

Soil samples were digested with nitric acid and hydrogen peroxide according to USEPA Method 3050B. Subsamples (0.500 ± 0.005 g) were weighed into graduated screw-cap polypropylene digestion tubes. Heating was carried out in a Teflon coated graphite hot-block digestor.

Portions (~2-4 g) of tissue samples were accurately weighed into graduated screw-cap polypropylene digestion tubes. Digestion with high-purity nitric acid was carried out in a Teflon coated graphite hot-block digestor.

Samples were diluted to volume (50 mL for soils and 40 mL for tissues) in the digestion vessels.

Analysis

Soil samples were diluted a further x10 and were analyzed for lead and cadmium using a VG PlasmaQuad II Inductively Coupled Plasma Mass Spectrometer (ICP-MS). Rhodium and terbium were used as internal standards. Some samples required further dilution to drop solution lead concentrations into the instrument calibration range. Lead and cadmium results for soil samples are reported in mg/kg (ppm) on a dry weight basis. The reporting limit for cadmium is 0.05 mg/kg and the reporting limit for lead is 0.5 mg/kg.

Tissue digest samples (vegetables and fish) were analyzed without further dilution using a Thermo X-7 ICP-MS instrument. Indium was used as an internal standard for these determinations. Some samples (shellfish, in particular) required further dilution to bring lead into the instrument calibration range. Although the actual detection limit is a function of the sample weight used, we established conservative reporting limits of 0.02 ng/g for cadmium and 0.1 ng/g for lead. All results for vegetation and fish samples are reported on the "as received" (wet weight) basis in ng/g (ppb).

QA/QC

Reagent Blanks - Results for the majority of the reagent blanks are close to, or below the reporting limits established for this analytical series. In essentially all cases, reagent blank levels are substantially lower than trace element concentrations detected in the samples. Reagent blank concentrations are calculated on the basis of the average sample weight/volume used for the analytical specimens. All reagent blank values have been reported. Sample results are not corrected for reagent blanks.

"Spiked" Samples - Calculated analytical spike recoveries for both lead and cadmium ranged from ~75-116% in vegetation and fish samples. Spikes were not carried out for soil samples. Some of the variability in spike recovery data may be due to variability in the "base" element concentration in the original specimen (separate sample portions were spiked prior to sample digestion). All spike levels were 12.5 µg/L (for the final solution concentration).

Duplicates - Reproducibility of analytical replicates is a function of variances in digestion recovery and instrument response in addition to factors relating to the homogeneity of the samples. It was noted, for example, that there seem to be higher variability (for lead, in particular) for vegetation samples that have exposed outer layers that can trap dirt. Better reproducibility was observed for peeled or smooth-skinned samples. As expected, reproducibility is somewhat poorer for element concentrations approaching the method detection limit.
The relatively high variability for fish and shellfish replicates is attributed to sample homogeneity. Skin-on fish fillets, for example, are quite difficult to homogenize to a point where 2-4g subsamples are identical in terms of trace element concentration.

Reference materials - A number of different reference materials were prepared and analyzed concurrently with the samples. NIST 1575 (Pine Needles) was run with all of the vegetation samples. This material is not certified for cadmium but literature values are consistent with the data reported. Lead results are in good agreement. Three different reference materials (NIST 1566b Oyster Tissue, NIST 2976 Mussel Tissue and DORM-2 Dogfish Muscle) were analyzed with the tissue samples with results that were generally consistent but a little on the low side in terms of recoveries. NIST 2709 and NIST 2711 were analyzed with the soil samples with results in good agreement with published data for EPA 3050 extraction.

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Inorganic Analytical Chemistry

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Produce	Sample Preparation
turnips	peeled
cauliflower	no greens, rinse
peppers	no seeds, ends off, rinse
Indian wheat	isolate seed head, no greens, rinse
potato	scrubbed and washed, peeled, analyze peel and insides
cucumber	skin on, seeds, rinse
beets	no greens, ends off, peeled
squash	peeled, analyze insides without seeds
carrots	scrubbed and washed, ends off, peel on
onions	ends off, peeled
shallot	ends off, keep 75% green, rinse
peas	keep in pod, if loose then as is, rinse
radish	scrubbed and washed, ends off, no greens
corn	kernels only, rinse
watermelon	insides only without seeds
pears	peel on, no seeds, rinse
swiss chard	treat as spinach or lettuce, as is, rinse
grapes	seeds in, rinse
apples	peel on, no seeds, rinse
zucchini	ends off, peel on, rinse
lettuce	as is, rinse
beans	ends off, rinse
tomato	ends off, rinse
rhubarb	as is, rinse
cabbage	as is, rinse
blueberries	as is, rinse
gooseberries	as is, rinse
strawberries	as is, rinse
raspberries	as is, rinse
cherries	as is, rinse
herbs	as is, rinse
broccoli	as is, rinse

Fish	Sample Preparation
smelt	head off, gutted
herring	fillet with skin on
mackerel	fillet with skin on
cod	fillet with skin on
flounder	fillet with skin on

Compromised Samples	
raspberry	Robert Killoran
apples	Robert Killoran
rhubarb	Robert Killoran
cherries	Robert Killoran
strawberries	Joe and Judy

Note: analyze as usual but make note that produce was frozen and packaged by homeowner and leak occurred during transit to lab.

Molluscs	Sample Preparation
clams	live - shuck and analyse soft tissues
mussels	live - shuck and analyse soft tissues

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
RB A	QA/QC	< 0.02	0.2
RB B	QA/QC	< 0.02	0.6
RB C	QA/QC	< 0.02	0.2
RB D	QA/QC	< 0.02	< 0.1
RB E	QA/QC	< 0.02	0.3
RB F	QA/QC	< 0.02	0.3
RB G	QA/QC	0.02	0.1
RB H	QA/QC	< 0.02	< 0.1
RB I	QA/QC	< 0.02	< 0.1
NIST 1575A	CRM	164	10300
NIST 1575B	CRM	144	10600
NIST 1575C	CRM	154	9400
NIST 1575D	CRM	162	9590
NIST 1575E	CRM	158	9770
NIST 1575F	CRM	155	10600
NIST 1575G	CRM	225	10400
NIST 1575H	CRM	138	9870
NIST 1575I	CRM	152	10000
NIST 1575J	CRM	149	9420
NIST 1575K	CRM	140	9870
NIST 1575L	CRM	146	9770
NIST 1575M	CRM	164	10600
NIST 1575N	CRM	162	10500
NIST 1575O	CRM	206	9920
NIST 1575P	CRM	151	11100
NIST 1575Q	CRM	152	11300
NIST 1575R	CRM	156	10800
NIST 1575S	CRM	156	10800
NIST 1575T	CRM	158	10500
NIST 1575U	CRM	163	10200
NIST 1575V	CRM	154	10500
NIST 1575W	CRM	162	10400
NIST 1575X	CRM	155	10600
NIST 1575Y	CRM	151	10800
52309-005	Spike Recovery (%)	86.5	95.3
52309-066	Spike Recovery (%)	99.1	99.5
52310-088	Spike Recovery (%)	85.1	99.8
52523-02	Spike Recovery (%)	93.4	101
52523-19	Spike Recovery (%)	84.2	98.8
52953-07	Spike Recovery (%)	87.4	96.1
52953-35	Spike Recovery (%)	89.2	97.6
52953-74	Spike Recovery (%)	90.3	102

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
51980-01A	Sunset U-Pick Strawberries	3.78	1.0
51980-01B	Duplicate	3.92	1.1
51980-02	Jemseg Strawberries	1.04	0.9
51980-03	Stanley Strawberries	1.38	1.7
51980-04	Sussex Strawberries	1.51	1.7
51980-05	Burton Strawberries	2.54	0.6
51980-06	Stanley Raspberries	5.62	0.7
51980-07	Temperance Vale Raspberries	1.27	0.5
51980-08	Sunset Drive Raspberries	1.27	0.8
51980-09	Maugerville Raspberries	17.2	1.2
52282-01A	CORN-FTN-004	1.65	1.1
52282-01B	Duplicate	1.63	1.5
52282-03A	BEETS-FTN-004	12.0	2.6
52282-03B	Duplicate	12.7	1.9
52282-04	ONIONS-FTN-004	10.2	0.9
52282-05	SQUASH-FTN-004	1.36	1.4
52282-06	RADISH-FTN-004	3.78	1.0
52282-07A	BEANS-FTN-004	0.67	1.6
52282-07B	Duplicate	0.45	0.8
52282-08A	TOMATOES-FTN-004	2.55	0.6
52282-08B	Duplicate	2.48	0.5
52282-09A	CARROTS-FTN-004	20.8	2.9
52282-09B	Duplicate	20.9	3.0
52283-02	TOMATOES-FTN-002	18.6	1.2
52283-03A	CUCUMBER-FTN-002	2.47	1.5
52283-03B	Duplicate	2.81	1.2
52283-04	BEANS-FTN-002	1.96	3.2
52283-05	CORN-FTN-002	9.51	0.8
52283-06	SQUASH-FTN-002	2.78	0.9
52283-07	BEETS-FTN-002	7.85	1.6
52283-08	TURNIP-FTN-002	16.6	1.1
52284-01	APPLES-FTN-001 (Young's Cove)	0.09	3.3
52284-02	CORN-FTN-001 (Young's Cove)	4.30	0.5
52284-04	CUCUMBER-FTN-001 (Young's Cove)	0.97	1.6
52284-05	TOMATOES-FTN-001 (Young's Cove)	12.9	0.8
52284-06	PEAS-FTN-001 (Young's Cove)	4.91	2.3
52284-07	BEANS-FTN-001 (Young's Cove)	2.56	1.5
52284-08	CARROTS-FTN-001 (Young's Cove)	10.9	10.5
52284-09	ONIONS-FTN-001 (Young's Cove)	26.3	3.6
52284-10	BEETS-FTN-001 (Young's Cove)	18.6	1.8
52286-01A	LETTUCE-PV-414	758	126
52286-01B	Duplicate	698	112
52286-02	SPINACH-PV-414	879	113
52286-03	TOMATO-PV-414	40.6	1.1
52286-10	LETTUCE-PV-413	107	79.2
52286-11	SPINACH-PV-413	595	87.4
52286-12	TOMATO-PV-413	5.85	0.9
52286-13A	PEPPER-PV-413	24.0	1.1

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52286-13B	Duplicate	23.6	1.0
52286-14	YELLOW BEANS-PV-413	0.80	4.7
52286-15	CUCUMBER-PV-413	2.44	3.6
52286-18	RASPBERRY-BD-309	4.97	164
52286-23 *	RASPBERRY-BD-310	23.3	217
52286-25 *	STRAWBERRY-BD-310	31.1	80.9
52286-26 *	CHERRIES-BD-310	6.72	218
52286-27A *	RHUBARB-BD-310	68.8	50.0
52286-27B *	Duplicate	58.8	36.1
52286-28 *	CRABAPPLES-BD-310	5.64	30.5
52286-29	TOMATO-PV-411	10.7	0.5
52286-30	BEANS-PV-411	1.12	3.0
52286-31	PEPPER-PV-411	24.3	2.6
52286-32	ONIONS-PV-411	22.2	2.2
52286-33	BEETS-PV-411	38.8	7.4
52286-34	TURNIP-PV-411	6.33	1.7
52286-35	CARROTS-PV-411	38.8	12.2
52286-36	CAULIFLOWER-PV-411	10.7	5.2
52286-37	BROCCOLI-PV-411	15.8	4.1
52286-39	RASPBERRY-PR-500	4.68	20.5
52286-40	APPLES-PR-500	1.02	2.6
52286-41	PEAS-PR-500	5.06	3.0
52286-42	TOMATO-PR-500	10.4	0.4
52286-43	BEETS-PR-500	45.0	5.5
52286-44A	ONIONS-PR-500	13.4	1.4
52286-44B	Duplicate	14.1	1.8
52286-45	BEANS-PR-500	0.98	3.6
52286-46A	LETTUCE-PR-500	110	45.2
52286-46B	Duplicate	109	43.2
52286-47	CARROTS-PR-500	46.7	22.0
52286-49	ONION-PR-504	14.2	2.9
52286-50	CUCUMBER-PR-504	2.53	1.6
52286-51	PEPPER-PR-504	17.3	1.1
52286-52	RASPBERRY-PR-504	4.60	60.8
52286-53	TOMATO-PR-504	7.41	0.8
52286-55	TURNIP-PR-504	16.9	6.6
52286-56	BEETS-PR-504	33.9	11.6
52286-57	LETTUCE-PR-504	157	69.6
52286-58	PARSLEY-PR-504	38.6	45.5
52286-59	ONION-PR-506	18.9	3.0
52286-60	CARROTS-PR-506	45.9	12.3
52286-61	TOMATO-PR-506	19.4	0.4
52286-62	CUCUMBER-PR-506	4.89	2.3
52286-63	BEANS-PR-506	1.56	1.8
52286-64	TURNIP-PR-506	14.3	7.2
52286-67	BEANS-BD-309	1.02	33.1
52291-03	BEANS-PV-409	1.38	9.5
52291-04	PEAS-PV-409	5.19	1.8

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Job No.: 1001701.01

November 07, 2005
Revised: December 06, 2005

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Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52291-05	CUCUMBER-PV-409	4.39	4.8
52291-06	ONIONS-PV-409	43.0	1.3
52291-07	LETTUCE-PV-409	133	67.5
52291-08	LETTUCE-PV-409-2	564	125
52291-09	TOMATO-PV-409-2	13.3	0.8
52291-10	TOMATO-PV-401	11.2	1.3
52291-11	BEANS-PV-401	3.94	10.1
52291-13	HERBS-PV-403-1	128	275
52291-20	CARROTS-PV-406	45.5	10.4
52291-21	ONIONS-PV-406	16.5	2.0
52291-22	BEANS-PV-406	0.73	3.9
52291-23	TOMATO-PV-406	8.76	0.8
52291-26	CARROTS-PV-400	54.3	34.3
52291-27	TOMATO-PV-400	27.0	1.1
52291-28	BASIL-PV-400	35.6	139
52291-29	BEANS-PV-400	1.48	3.8
52291-30	LETTUCE-PV-400	122	63.4
52291-31	PARSLEY-PV-400	73.0	106
52291-32	BEETS-PV-400	25.0	5.8
52291-33	PEAS-PV-400	3.64	11.4
52291-35	CUCUMBER-PV-405	11.5	4.6
52291-36	BEANS-PV-405	4.80	3.5
52291-37	ONIONS-PV-405	26.3	2.5
52291-38	RASPBERRY-PV-405	32.0	89.5
52291-39	LETTUCE-PV-405	102	39.6
52291-40	CARROTS-PV-405	120	32.1
52291-41	TOMATO-PV-405	31.8	0.8
52291-44	ONION-PV-402	14.0	2.2
52291-45	BEANS-PV-402	2.97	2.6
52291-46	APPLES-PV-402	0.53	4.0
52291-47	CUCUMBER-PV-402	4.03	2.0
52291-48A	CABBAGE-PV-402	13.4	9.3
52291-48B	Duplicate	9.66	2.8
52291-49	ZUCCHINI-PV-402	3.45	2.6
52291-50	GREEN PEPPER-PV-402	38.4	3.0
52291-51	TOMATO-PV-402	20.7	0.5
52291-56	BEANS-PV-412	1.71	5.2
52291-57	WATERMELON-PV-402	9.91	1.8
52291-58	BLUEBERRY-PV-402	8.96	143
52291-59	GRAPES-PV-402	0.47	5.4
52291-60	PEARS-PV-402	15.2	7.6
52291-63	RASPBERRY-PV-402-2	7.23	40.0
52291-64	ONIONS-PV-408	9.14	2.1
52291-65	BEETS-PV-408	12.2	6.2
52291-66	TOMATO-PV-408	10.8	1.8
52291-67	CARROTS-PV-408	25.8	41.3
52291-68	PEAS-PV-408	1.38	6.8
52291-70	ONION-PV-407	35.4	3.5

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52291-71	CUCUMBER-PV-407	2.50	2.9
52291-72	LETTUCE-PV-407	220	146
52291-73	RADISH-PV-407	35.0	33.9
52291-74	TOMATO-PV-407	10.7	1.0
52297-01	SQUASH-FTN-003	5.84	4.0
52297-02	CUCUMBER-FTN-003	1.54	1.8
52297-03	BEETS-FTN-003	11.4	1.3
52297-05	BEANS-FTN-003	1.36	0.9
52297-06	CORN-FTN-003	2.74	1.1
52297-07	CARROTS-FTN-003	4.46	4.8
52297-08	ONIONS-FTN-003	1.16	0.5
52299-01	SQUASH-FTN-006	3.03	0.7
52299-02	TURNIP-FTN-006	11.7	0.2
52299-03	PEPPER-FTN-006	13.9	0.6
52299-04	TOMATO-FTN-006	11.7	0.7
52299-05	PEAS-FTN-006	0.86	2.2
52299-06	SPINACH-FTN-006	31.4	18.1
52299-07	CARROTS-FTN-006	6.18	6.0
52299-08	CORN-FTN-006	2.09	1.0
52299-09	CUCUMBER-FTN-006	2.58	1.9
52300-01	SPINACH-FTN-005	64.0	27.9
52300-02	BEANS-FTN-005	0.85	1.6
52300-03	PEPPER-FTN-005	31.8	1.3
52300-04	TOMATO-FTN-005	12.6	0.4
52300-05	BEETS-FTN-005	7.88	1.6
52300-06	PEAS-FTN-005	2.75	3.4
52300-07	CUCUMBER-FTN-005	1.42	0.9
52300-08	RADISH-FTN-005	3.49	1.2
52300-09	CARROTS-FTN-005	75.4	28.7
52300-10	ONION-FTN-005	1.68	1.7
52300-12A	SQUASH-FTN-005	9.52	2.4
52300-12B	Duplicate	9.57	1.4
52300-13	TURNIP-FTN-005	4.13	0.3
52309-001	BEANS-BD-311	4.92	1.9
52309-002	CUCUMBER-BD-311	7.31	2.1
52309-004	TOMATO-BD-311	11.2	0.5
52309-005	GREEN ONION-BD-311	39.5	3.1
52309-006	SQUASH-BD-311	7.96	3.3
52309-007	RASPBERRY-BD-311	14.1	50.2
52309-009	TOMATO-BD-300	14.8	0.9
52309-010	HERBS-BD-300	35.5	128
52309-012	RHUBARB-BD-306	19.2	74.6
52309-014	BEETS-BD-305	16.2	5.2
52309-015	BEANS-BD-305	1.66	8.8
52309-016	CUCUMBER-BD-305	4.27	1.7
52309-018	CARROTS-BD-305	62.2	10.6
52309-019	LETTUCE-BD-302	31.7	28.7
52309-020	CABBAGE-BD-302	72.0	14.7

RPC
921 College Hill Rd,
Fredericton, N.B. E3B 6Z9
Report No.: 52143-IAS

Jacques Whitford Environment
PO Box 1116
Fredericton NB E3B 5C2
Attn: David Rae
Job No.: 1001701.01

November 07, 2005
Revised: December 06, 2005

Fax: 506.452.7652

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52309-021	CORN-BD-302	22.6	1.4
52309-023A	CARROTS-BD-302	23.1	9.3
52309-023B	Duplicate	24.3	11.1
52309-024	BEETS-BD-302	41.0	2.9
52309-026	BEANS-BD-301	1.35	3.9
52309-027	CUCUMBER-BD-301	3.73	2.1
52309-028	PEAS-BD-301	3.04	5.8
52309-029	CARROTS-BD-301	31.4	13.1
52309-030	CUCUMBER-BD-308	3.76	2.5
52309-031	PEAS-BD-308	2.29	5.9
52309-032	BEANS-BD-308	0.72	6.2
52309-033	CARROTS-BD-308	68.5	37.8
52309-034	TOMATO-BD-308	14.7	1.2
52309-036	ZUCCHINI-BD-304	2.00	8.9
52309-038	BEANS-BD-303	1.01	4.0
52309-039	PEAS-BD-303	0.78	2.2
52309-040	TOMATO-BD-303	4.60	0.8
52309-045	BEANS-BD-310	4.00	3.1
52309-046	PEAS-BD-310	3.84	8.3
52309-047	BEETS-BD-310	183	12.2
52309-048	CARROTS-BD-310	150	27.1
52309-049	RADISH-BD-310	38.6	9.4
52309-050	SPINACH-BD-310	1260	349
52309-051	PUMPKIN-BD-310	17.8	4.2
52309-052	CUCUMBER-BD-310	5.20	1.8
52309-053	RASPBERRY-BD-310	89.5	280
52309-055	ONION-BD-312	16.9	5.0
52309-056	BEETS-BD-312	44.3	3.3
52309-057	BEANS-BD-312	2.06	3.4
52309-058	CUCUMBER-BD-312	5.09	2.6
52309-059	LETTUCE-BD-312	197	37.8
52309-060	TOMATO-BD-312	15.8	1.2
52309-061	CABBAGE-BD-312	67.6	7.4
52309-062A	TURNIP-BD-312	27.5	5.4
52309-062B	Duplicate	28.2	6.3
52309-063	BEETS-PR-509	42.8	16.5
52309-064	CUCUMBER-PR-5098	7.30	18.9
52309-065	CORN-PR-509	3.86	1.9
52309-066	BEANS-PR-509	1.26	4.7
52309-067	CARROTS-PR-509	116	22.3
52309-068	TOMATO-PR-509	7.36	1.2
52309-069	PEAS-PR-509	10.9	10.9
52309-071	RASPBERRY-PR-509	5.72	29.0
52309-072	RHUBARB-PR-509	10.9	77.2
52309-074	CORN-PR-508	4.03	2.2
52309-075	CARROTS-PR-508	89.7	40.9
52309-076	CUCUMBER-PR-508	1.88	1.6
52309-077	PEAS-PR-508	3.37	3.1

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52309-078	STRAWBERRY-PR-508	5.88	4.4
52309-079A	BEANS-PR-508	4.45	4.5
52309-079B	Duplicate	3.94	4.0
52309-080	BEETS-PR-508	49.8	8.9
52309-081	PUMPKIN-PR-508	1.41	1.6
52309-082	SQUASH-PR-508	12.8	3.8
52309-083	ONION-PR-508	22.7	2.2
52309-084	TOMATO-PR-508	8.36	1.6
52309-085	PEPPER-PR-508	18.9	2.0
52309-088	ONION-PR-510	26.6	5.5
52309-089	BEETS-PR-510	110	64.5
52309-090	PEAS-PR-510	13.6	4.3
52309-091	CARROTS-PR-510	115	57.1
52309-092	TURNIP-PR-510	16.0	17.9
52309-093	BEAN-PR-510	2.04	5.3
52309-094	CUCUMBER-PR-510	6.22	7.3
52309-098	BEAN-PR-511	0.89	11.9
52309-100	CUCUMBER-PR-511	3.53	2.9
52310-027A	RASPBERRY-LBD-125-1	24.9	67.9
52310-027B	Duplicate	23.3	37.7
52310-029	STRAWBERRY-LBD-125-2	19.2	31.1
52310-030	ONION-LBD-125-2	46.2	12.5
52310-031	CUCUMBER-LBD-125-2	9.21	10.3
52310-032	SWISS CHARD-LBD-125-2	338	324
52310-033	TOMATO-LBD-125-2	27.3	1.2
52310-034	ZUCCHINI-LBD-125-2	2.97	1.4
52310-035	BEAN-LBD-125-2	1.09	8.4
52310-036	BEET-LBD-125-2	65.6	26.7
52310-037	RED ONION-LBD-125-2	32.7	11.7
52310-038	CHERRY TOMATO-LBD-123	32.5	3.7
52310-039	TOMATO-LBD-123	18.2	5.2
52310-040A	CUCUMBER-LBD-123	9.65	7.5
52310-040B	Duplicate	9.76	7.8
52310-041	CARROT-LBD-123	171	95.1
52310-042	GREEN BEAN-LBD-123	8.64	7.0
52310-043	YELLOW BEAN-LBD-123	5.06	11.6
52310-044	ONION-LBD-123	50.1	12.6
52310-046	RASPBERRY-LBD-119	12.7	147
52310-047	RASPBERRY-LBD-117-1	16.4	166
52310-048	GOOSEBERRY-LBD-117-1	4.98	221
52310-049	RHUBARB-LBD-113	67.2	515
52310-050	GOOSEBERRY-LBD-113	5.09	104
52310-051	RHUBARB-LBD-111	57.2	86.4
52310-052	TURNIP-LBD-109	19.7	8.4
52310-053	CARROT-LBD-109	113	51.8
52310-054	TOMATO-LBD-109	19.5	1.8
52310-055	ZUCCHINI-LBD-109	8.52	7.6
52310-056	BEET-LBD-109	76.8	35.9

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52310-057	CUCUMBER-LBD-109	12.2	12.0
52310-059	CHARD-LBD-109	315	699
52310-060	RED ONION-LBD-109	23.2	7.3
52310-061	GREEN BEAN-LBD-109	2.67	23.7
52310-062	YELLOW BEAN-LBD-109	1.98	14.2
52310-063	PEAS-LBD-109	11.8	19.7
52310-064	STRAWBERRY-LBD-109	6.44	92.7
52310-065	ONION-LBD-109	56.2	9.9
52310-066	BEET-LBD-105-1	131	44.4
52310-067	PEAS-LBD-105-1	3.86	32.5
52310-068	ONION-LBD-105-1	46.2	8.8
52310-069	RADISH-LBD-105-1	44.4	32.1
52310-070	CUCUMBER-LBD-105-1	11.7	5.8
52310-071	TOMATO-LBD-105-1	31.6	1.5
52310-072	CARROT-LBD-105-1	224	225
52310-074	BEAN-LBD-105-1	2.97	10.8
52310-075	STRAWBERRY-LBD-105-2	29.2	47.3
52310-076	CRABAPPLE-LBD-105-2	1.33	20.0
52310-077	ONION-LBD-100	84.6	3.6
52310-079	BEET-LBD-100	82.4	32.4
52310-080	CUCUMBER-LBD-100	11.8	6.9
52310-081	RASPBERRY-TS-205-1	17.8	54.3
52310-082	RHUBARB-TS-205-1	48.3	314
52310-083	CORN-TS-202-1	64.2	5.2
52310-085	TURNIP-TS-202-2	11.6	8.1
52310-086	BEAN-TS-202-2	2.22	17.2
52310-087	CARROT-TS-202-2	165	59.9
52310-088	ONION-TS-202-2	45.2	2.9
52310-089	TOMATO-TS-202-3	19.6	0.9
52310-090	LETTUCE-TS-202-3	377	416
52310-091	BROCCOLI-TS-202-3	8.54	14.5
52310-092	RADISH-TS-202-3	49.4	25.8
52310-093	PEAS-TS-201	3.54	10.5
52310-094	TOMATO-TS-201	33.7	1.1
52310-095	PARSNIP-TS-204	31.8	84.7
52310-096	TOMATO-TS-204	10.5	0.6
52310-097	CARROT-TS-204	39.2	29.4
52310-098	SHELL PEA-TS-204	2.68	11.1
52310-099	SNOW PEA-TS-204	0.80	5.6
52310-100	ONION-TS-204	15.9	6.2
52310-101	CUCUMBER-TS-204	5.70	4.7
52310-102	DILL-TS-204	157	61.8
52310-103	GREEN PEPPER-TS-204	23.8	2.6
52310-105	RHUBARB-TS-207	54.8	233
52310-106	TOMATO-TS-207	33.5	1.0
52310-107	BEAN-TS-207	0.89	6.2
52310-108	PEAS-TS-207	1.67	3.6
52310-109	RHUBARB-LBD-107	70.3	287

Analysis of Samples

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		Concentration (ng/g)	
52318-01	RASBERRY-PTR-599	7.72	15.5
52426-12	CARROT-LB-104	186	291
52426-13	CARROT-TS-208	337	373
52426-14	CARROT-BD-316	44.6	19.7
52426-15	CARROT-PR-514	53.2	12.5
52426-16	CUCUMBER-BD-316	5.83	1.2
52426-17	CUCUMBER-PR-514	2.86	1.4
52426-18	APPLE-TS-208	4.26	12.1
52426-19	APPLE-TS-6206	3.62	13.0
52426-20	APPLE-TS-206	5.04	11.3
52426-21	BEET-PR-514	55.8	6.0
52426-22	BEET-PR-6514	113	16.1
52426-23	BEET-BD-316	20.8	5.9
52426-24	BEET-LB-104	237	104
52426-25	RHUBARB-BD-6316	10.5	7.5
52426-26	RHUBARB-BD-316	5.80	2.9
52426-27	RHUBARB-LB-106	106	726
52426-28	RHUBARB-LB-6106	134	2100
52426-29	RHUBARB-PR-514	24.9	23.3
52426-30	RHUBARB-TS-203	229	179
52426-31	BEANS-BD-316	1.46	1.7
52426-32	BEANS-BD-6316	1.37	3.6
52426-33	BEANS-LB-104	7.69	5.3
52426-34	BEANS-LB-6104	6.55	8.2
52426-35	BEANS-TS-208	14.8	18.4
52426-36	STRAWBERRY-TS-208	52.5	170
52426-37	RASPBERRY-LB-104	27.3	556
52426-38	RASPBERRY-TS-208	22.1	232
52426-40	PEPPER-PR-514	70.9	2.9
52426-41	SWISS CHARD-BD-6316	63.8	17.8
52426-42	SWISS CHARD-BD-316	46.3	18.1
52426-43	TOMATO-BD-6316	14.4	0.6
52426-44	TOMATO-BD-316	9.75	0.5
52426-45	TOMATO-TS-208	53.4	1.2
52426-46	TOMATO-TS-6208	46.0	1.7
52426-47	TOMATO-PR-6514	10.6	0.5
52426-48	TOMATO-PR-514	15.0	0.8
52426-49A	ONION-TS-208	157	20.2
52426-49B	Duplicate	150	19.9
52426-50	ONION-TS-6208	110	6.8
52426-51	ONION-TS-206	267	37.7
52426-52	ONION-PR-514	36.0	3.0
52426-53	ONION-LB-104	22.0	9.5
52505-01	RHUBARB-TS-208	84.3	144
52523-01	PEAS-PR-507	3.97	1.8
52523-02A	TOMATO-PR-507	16.7	3.9
52523-02B	Duplicate	15.0	0.3
52523-03	ONION-PR-507	14.8	3.0

RPC
921 College Hill Rd,
Fredericton, N.B. E3B 6Z9
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Attn: David Rae
Job No.: 1001701.01

November 07, 2005
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Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52523-04	CUCUMBER-PR-507	2.50	4.4
52523-06	LETTUCE-PR-507	4.73	1.8
52523-07	YELLOW BEAN-PR-507	2.06	2.6
52523-18	BEETS-TS-204	17.0	65.1
52523-19A	STRAWBERRY-TS-204	1.84	20.6
52523-19B	Duplicate	1.79	21.9
52523-20	RASPBERRY-LBD-109	52.4	1620
52523-21	BEANS-BD-304	0.36	2.2
52523-22	CARROTS-BD-304	17.8	30.0
52523-24	APPLES-BD-304	0.30	2.0
52523-25	GOOSEBERRY-BD-304	1.78	23.7
52523-26	CURRANTS-BD-304	8.55	76.2
52523-27	ONION-BD-304	11.3	8.6
52523-28	GRAPES-BD-304	0.32	3.1
52523-29	BEETS-BD-304	30.3	27.9
52523-30	CUCUMBER-BD-307	1.58	1.0
52523-31	YELLOW BEAN-BD-307	0.92	2.8
52523-32	PEAS-BD-307	0.81	2.9
52523-33	TOMATO-BD-307	15.3	0.6
52523-34	ONION-PR-509	47.7	6.2
52523-35	SHALLOT-PR-509	65.4	8.0
52523-36	PEPPER-PR-509	28.5	1.6
52523-37	ONION-BD-310	24.2	4.5
52523-38	LETTUCE-BD-310	283	135
52523-39	RASPBERRY-PR-501	41.1	8.5
52523-40	GRAPE-PR-501	1.11	2.7
52523-41	BLUEBERRY-PR-501	2.06	6.0
52523-42	HERBS-PR-501	610	101
52523-43	BEETS-PR-501	108	49.6
52523-44	SQUASH-PR-500	3.83	2.1
52523-45	RHUBARB-PR-500	25.2	44.0
52523-47	RADISH-PR-504	7.70	2.6
52523-48	CARROTS-PR-505	39.9	28.2
52523-49	ONION-PR-505	22.6	3.7
52523-50	TOMATO-PR-505	6.70	0.3
52523-51	WHEAT-PR-505	4.11	53.9
52523-52	YELLOW BEAN-PR-505-2	1.61	1.4
52523-53	CARROTS-PR-505-2	101	14.6
52523-54	CUCUMBER-PR-505-2	1.86	1.4
52523-55	CABBAGE-PR-505-2	1.06	6.7
52952-01	CUCUMBER-PV-410	18.0	10.0
52952-02	YELLOW BEAN-PR-505	1.03	4.6
52952-03	TOMATO-PV-410	29.0	2.2
52952-04	CUCUMBER-PV-411	3.19	4.2
52952-05	SHALLOT-PV-413	7.65	4.2
52952-06	TOMATO-PR-505-2	12.8	0.3
52952-07	ONION-PR-505-2	36.1	1.3
52952-10	CUCUMBER-PR-505	6.31	6.7

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52952-11	YELLOW BEAN-PV-410	0.85	4.3
52953-01A	BEAN-LBD-6100	7.44	16.3
52953-01B	Duplicate	7.78	16.0
52953-02	BEAN-LBD-100	5.36	10.0
52953-03	TOMATO-LBD-100	22.8	1.7
52953-04	CHIVES-LBD-104	94.9	527
52953-05	ARTICHOKE-LBD-104	16.7	8.3
52953-06	CORN-LBD-109	57.8	1.1
52953-07	SQUASH-LBD-109	6.84	13.9
52953-08	CHERRY TOMATO-LBD-109	27.3	3.5
52953-09	PEPPER-LBD-109	51.0	5.2
52953-10A	GRAPE-LBD-125	1.40	18.6
52953-10B	Duplicate	1.40	19.9
52953-11	APPLES-LBD-150	0.62	6.0
52953-12	CUCUMBER-LBD-150	5.87	9.4
52953-13	TOMATO-LBD-150	20.0	1.7
52953-16	CRABAPPLE-LBD-151	1.23	13.7
52953-17	BEAN-TS-201	4.46	10.6
52953-18	SQUASH-TS-201	9.26	9.5
52953-19	CELERY-TS-204	20.6	29.6
52953-20	BEAN-TS-204	2.56	5.3
52953-21	BEAN-TS-6204	8.91	8.2
52953-22	CUCUMBER-TS-206	7.58	14.1
52953-23	PEPPER-TS-207	97.7	3.0
52953-24	SUNFLOWER-TS-203	59.1	6.5
52953-26	RUTABAGA-TS-220	10.3	1.2
52953-27	CABBAGE-TS-220	6.20	0.4
52953-28	CORN-TS-6220	4.12	1.2
52953-29	CORN-TS-220	3.67	1.0
52953-30	BROCCOLI-TS-220	17.3	2.8
52953-31	TOMATO-TS-220	35.6	0.5
52953-34	RUTABAGA-TS-220-2	12.1	1.3
52953-35	CABBAGE-TS-220-2	6.17	0.4
52953-36	BEAN-TS-250	30.3	68.2
52953-37	CUCUMBER-TS-250	9.66	7.8
52953-38	PUMPKIN-BD-300	1.31	1.5
52953-39	ZUCCHINI-BD-6301	1.59	3.0
52953-40	ZUCCHINI-BD-301	1.49	2.7
52953-41	SQUASH-BD-301	1.40	5.0
52953-42	CORN-BD-301	6.10	0.7
52953-43	CUCUMBER-BD-303	1.51	8.6
52953-44	PUMPKIN-BD-309	3.20	1.9
52953-45	BEAN-BD-309	4.26	30.5
52953-46	LETTUCE-BD-309	91.8	262
52953-49A	BASIL-BD-311	79.9	95.2
52953-49B	Duplicate	71.2	84.4
52953-50	BEAN-BD-351	9.04	8.8
52953-51	BEAN-BD-6351	9.04	8.4

RPC
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Attn: David Rae
Job No.: 1001701.01

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Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52953-52	BEETS-BD-351	269	28.8
52953-53	ONION-BD-351	384	13.9
52953-54	CUCUMBER-BD-351	32.1	8.3
52953-55	TOMATO-BD-351	26.1	0.6
52953-58	CUCUMBER-PV-400	6.40	1.5
52953-59	CUCUMBER-PV-401	3.79	10.0
52953-60	PLUMS-PV-402	1.21	79.2
52953-61	CORN-PV-402	10.8	0.8
52953-62	CUCUMBER-PV-403	5.01	2.5
52953-65	CUCUMBER-PV-406	5.17	2.3
52953-66	CUCUMBER-PV-408	1.00	2.0
52953-67	SQUASH-PV-409	8.05	2.4
52953-68	SPINACH-PV-409	646	134
52953-69	CUCUMBER-PV-412	1.44	2.9
52953-70	CUCUMBER-PR-500	4.82	1.5
52953-71	CUCUMBER-PR-501	5.11	3.3
52953-72	BEAN-PR-504	0.48	3.4
52953-73	BEAN-PR-6504	9.13	7.5
52953-74	CARROTS-PR-504	66.7	41.0
52953-76	BEETS-PR-506	27.6	1.8
52953-77	TURNIP-PR-509	4.96	4.1
52953-78	CORN-PR-510	7.90	1.2
52953-79	CORN-PR-514	1.68	0.6
53222-01	TURNIP-FTN-1000	4.20	0.6
53222-02	APPLES-FTN-1000	0.21	1.9
53222-03	GREEN PEPPER-FTN-1000	15.0	1.2
53222-04	RADISH-FTN-1000	4.06	1.4
53222-05	SWISS CHARD-FTN-1000	12.2	11.0
53222-06	LETTUCE-FTN-1000	148	59.4
53222-07	PEAS-FTN-1000	1.49	1.3
53222-08	ROMAINE LETTUCE-FTN-1000	60.2	14.8
53222-09A	PEAS-FTN-2000	3.07	2.9
53222-09B	Duplicate	3.09	2.0
53222-10A	RADISH-FTN-2000	5.36	1.8
53222-10B	Duplicate	5.81	1.8
53222-11	APPLES-FTN-2000	0.22	0.8
53222-12	GREEN PEPPER-FTN-2000	12.0	0.8
53222-13A	APPLES-FTN-4000	0.11	0.5
53222-13B	Duplicate	0.13	0.5
53222-14	GREEN PEPPER-FTN-4000	18.6	3.0
53222-15	TURNIP-FTN-4000	2.49	0.6
53222-16	LETTUCE-FTN-4000	5.73	1.0
53222-17	ROMAINE LETTUCE-FTN-61000	49.4	17.3
53222-18	LETTUCE-FTN-64000	5.51	2.5

* Note: Sample was analyzed as usual. Produce was frozen and packaged by homeowner. Leak occurred during transit to lab. Result may be compromised.

RPC
921 College Hill Rd,
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Fax: 506.452.7652

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead	Mass
		Concentration (ng/g)		(g)
RB J	QA/QC	0.04	< 0.1	-
RB K	QA/QC	< 0.02	< 0.1	-
RB L	QA/QC	0.04	< 0.1	-
RB M	QA/QC	0.04	< 0.1	-
NIST 1575Z	CRM	149	9700	-
NIST 1575AA	CRM	144	9930	-
NIST 1575AB	CRM	154	10100	-
NIST 1575AC	CRM	149	9820	-
NIST 1575AD	CRM	151	10000	-
NIST 1575AE	CRM	144	9960	-
NIST 1575AF	CRM	258	10600	-
NIST 1575AG	CRM	150	10500	-
NIST 1575AH	CRM	318	10400	-
NIST 1575AI	CRM	133	9910	-
52282-02	Spike Recovery (%)	84.6	94.0	-
52282-02 (Peel)	Spike Recovery (%)	75.7	97.9	-
52953-75	Spike Recovery (%)	92.2	100	-
52953-75 (Peel)	Spike Recovery (%)	89.8	106	-

52282-02A	POTATO-FTN-004	30.4	0.5	308.27
52282-02B	Duplicate	29.4	0.2	-
52282-02A (Peel)	POTATO-FTN-004 (Peel)	42.9	9.3	73.36
52282-02B (Peel)	Duplicate (Peel)	43.9	9.0	-
52283-01	POTATO-FTN-002	26.3	0.5	216.59
52283-01 (Peel)	POTATO-FTN-002 (Peel)	43.6	9.9	38.7
52284-03	POTATO-FTN-001 (Young's Cove)	40.2	7.9	115.71
52284-03 (Peel)	POTATO-FTN-001 (Young's Cove) (Peel)	67.4	6.7	41.87
52286-24	POTATO-BD-309	22.1	1.4	143.81
52286-24 (Peel)	POTATO-BD-309 (Peel)	29.4	20.7	91.68
52286-54	POTATO-PR-504	27.4	2.3	263.24
52286-54 (Peel)	POTATO-PR-504 (Peel)	33.5	18.1	72.83
52291-14	POTATO-PV-403-2	50.3	5.2	60.01
52291-14 (Peel)	POTATO-PV-403-2 (Peel)	71.3	23.5	36.44
52291-18	POTATO-PV-406 (WHITE)	13.2	1.0	487.21
52291-18 (Peel)	POTATO-PV-406 (WHITE) (Peel)	18.3	15.1	141.61
52291-19	POTATO-PV-406 (RED)	12.3	1.1	259.61
52291-19 (Peel)	POTATO-PV-406 (RED) (Peel)	15.9	11.4	108.67
52291-42	POTATO-PV-402-1	20.1	2.7	127.11
52291-42 (Peel)	POTATO-PV-402-1 (Peel)	38.2	24.2	39.42
52291-43	POTATO-PV-402-2	13.2	1.4	62.8
52291-43 (Peel)	POTATO-PV-402-2 (Peel)	23.5	52.8	45.32
52291-54	POTATO-PV-412 GARDEN1	66.0	3.5	182.81
52291-54 (Peel)	POTATO-PV-412 GARDEN1 (Peel)	75.9	33.2	99.43
52291-55	POTATO-PV-412 GARDEN2	57.7	2.7	321.06
52291-55 (Peel)	POTATO-PV-412 GARDEN2 (Peel)	69.4	54.5	146.06
52297-04	POTATO-FTN-003	14.0	0.9	187.37
52297-04 (Peel)	POTATO-FTN-003 (Peel)	24.6	11.1	35.45
52300-11	POTATO-FTN-005	31.3	0.2	159.62

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead	Mass
		Concentration (ng/g)		(g)
52300-11 (Peel)	POTATO-FTN-005 (Peel)	52.4	11.7	57.06
52309-022	POTATO-BD-302	18.3	0.7	285.56
52309-022 (Peel)	POTATO-BD-302 (Peel)	23.1	4.6	38.2
52309-044	POTATO-BD-310	44.0	2.8	507.33
52309-044 (Peel)	POTATO-BD-310 (Peel)	54.0	14.7	153.9
52309-054	POTATO-BD-312	54.0	2.4	195.13
52309-054 (Peel)	POTATO-BD-312 (Peel)	69.7	84.8	66.85
52309-070	POTATO-PR-509	33.9	0.9	273.13
52309-070 (Peel)	POTATO-PR-509 (Peel)	41.3	26.8	84.56
52309-073	POTATO-PR-508	53.9	0.6	194.35
52309-073 (Peel)	POTATO-PR-508 (Peel)	19.0	22.4	69.07
52309-087	POTATO-PR-510	31.8	2.6	196.78
52309-087 (Peel)	POTATO-PR-510 (Peel)	46.5	141	80.13
52309-099	POTATO-PR-511	30.9	1.1	201.67
52309-099 (Peel)	POTATO-PR-511 (Peel)	35.6	5.8	34.96
52310-028	POTATO-LBD-125-2	121	12.0	399.4
52310-028 (Peel)	POTATO-LBD-125-2 (Peel)	41.5	24.2	82.14
52310-045	POTATO-LBD-123	57.6	5.3	200.89
52310-045 (Peel)	POTATO-LBD-123 (Peel)	69.2	18.4	90
52310-058	POTATO-LBD-109	31.3	8.2	182.91
52310-058 (Peel)	POTATO-LBD-109 (Peel)	162	45.4	93.41
52310-073	POTATO-LBD-105-1	16.0	2.4	109.67
52310-073 (Peel)	POTATO-LBD-105-1 (Peel)	66.0	6.4	71.82
52310-078	POTATO-LBD-100	47.1	5.0	194.2
52310-078 (Peel)	POTATO-LBD-100 (Peel)	56.8	18.0	108.64
52310-084	POTATO-TS-202-2	63.9	8.5	198.76
52310-084 (Peel)	POTATO-TS-202-2 (Peel)	84.2	97.0	71.01
52426-39	POTATO-LB-104	12.0	6.0	58.71
52426-39 (Peel)	POTATO-LB-104 (Peel)	19.4	30.1	35.92
52523-05	POTATO-PR-507	28.5	0.8	363.68
52523-05 (Peel)	POTATO-PR-507 (Peel)	32.4	6.2	99.46
52523-23	POTATO-BD-304	12.6	1.3	423.17
52523-23 (Peel)	POTATO-BD-304 (Peel)	14.3	18.3	132.72
52523-46	POTATO-PR-503	47.6	1.1	383.37
52523-46 (Peel)	POTATO-PR-503 (Peel)	60.2	15.4	120.86
52953-63	POTATO-PV-404	41.2	14.5	39.4
52953-63 (Peel)	POTATO-PV-404 (Peel)	45.7	13.2	17.5
52953-64	POTATO-PV-6404	50.2	5.7	33.61
52953-64 (Peel)	POTATO-PV-6404 (Peel)	53.4	7.0	14.81
52953-75A	POTATO-PR-506	29.6	1.7	166.85
52953-75B	Duplicate	28.8	1.8	-
52953-75A (Peel)	POTATO-PR-506 (Peel)	49.5	20.9	36.47
52953-75B (Peel)	Duplicate (Peel)	45.0	21.4	-

Analysis of Samples

RPC ID	**Client ID**	**Cadmium**	**Lead**
		Concentration (ng/g)	
RB N	QA/QC	< 0.02	< 0.1
RB O	QA/QC	< 0.02	< 0.1
RB P	QA/QC	< 0.02	0.2
DORM-2A	CRM	36.4	58.3
DORM-2B	CRM	35.9	51.2
DORM-2C	CRM	37.1	58.3
DORM-2D	CRM	38.1	54.1
DORM-2E	CRM	36.0	49.4
DORM-2F	CRM	36.4	50.1
DORM-2G	CRM	39.4	44.1
NIST 1566A	CRM	2160	275
NIST 1566B	CRM	2150	275
NIST 2976A	CRM	708	1170
NIST 2976B	CRM	724	2140
53143-42	Spike Recovery (%)	76.2	99.9
52562-05	Spike Recovery (%)	86.1	116
52953-93	Spike Recovery (%)	92.7	100
52143-01A	MACKEREL-BD-000-1	17.2	22.0
52143-01B	Duplicate	14.7	19.2
52143-02	MACKEREL-BD-000-2	8.81	2.6
52143-03	MACKEREL-BD-000-3	12.1	6.7
52143-04	MACKEREL-BD-000-4	11.5	2.2
52143-05	MACKEREL-BD-000-5	60.4	4.6
52143-06	MACKEREL-BD-000-6	10.4	4.0
52143-07	MACKEREL-BD-000-7	17.6	36.8
52143-08	MACKEREL-BD-000-8	8.30	2.6
52143-09	MACKEREL-BD-000-9	6.06	9.0
52143-10	MACKEREL-BD-000-10	18.4	3.9
52143-11	MACKEREL-BD-6000-11	7.09	12.3
52143-12	MACKEREL-BDI-000-1	22.8	11.9
52143-13	MACKEREL-BDI-000-2	7.71	6.9
52143-14	MACKEREL-BDI-000-3	6.71	1.4
52143-15	MACKEREL-BDI-000-4	6.25	2.6
52143-16	MACKEREL-BDI-000-5	9.48	1.9
52143-17	MACKEREL-BDI-000-6	31.6	3.1
52143-18	MACKEREL-BDI-000-7	3.54	2.2
52143-19	MACKEREL-BDI-000-8	17.8	3.1
52143-20	MACKEREL-BDI-000-9	3.59	1.0
52143-21A	MACKEREL-BDI-000-10	5.95	1.1
52143-21B	Duplicate	16.4	1.5
52143-22	MACKEREL-BDI-6000-11	24.8	2.4
52143-23	MACKEREL-LBD-000-1	8.22	3.4
52143-24	MACKEREL-LBD-000-2	21.6	6.1
52143-25	MACKEREL-LBD-000-3	11.0	4.7
52143-26	MACKEREL-LBD-000-4	14.0	2.6
52143-27	MACKEREL-LBD-000-5	11.9	2.3
52143-28	MACKEREL-LBD-000-6	17.6	1.9

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52143-29	MACKEREL-LBD-000-7	31.8	6.5
52143-30	MACKEREL-LBD-000-8	17.5	2.0
52143-31	MACKEREL-LBD-000-9	6.47	2.5
52143-32	MACKEREL-LBD-000-10	22.4	5.8
52143-33	MACKEREL-LBD-6000-11	16.5	1.8
52143-34	MACKEREL-PV-000-1	22.4	4.0
52143-35	MACKEREL-PV-000-2	20.0	4.6
52143-36	MACKEREL-PV-000-3	9.98	11.2
52143-37	MACKEREL-PV-000-4	26.2	6.1
52143-38	MACKEREL-PV-000-5	31.4	7.2
52143-39	MACKEREL-PV-000-6	3.27	1.4
52143-40	MACKEREL-PV-000-7	12.0	3.5
52143-41	MACKEREL-PV-000-8	19.4	3.7
52143-42	MACKEREL-PV-000-9	37.5	7.0
52143-43	MACKEREL-PV-000-10	13.1	3.2
52143-44	MACKEREL-PV-6000-11	20.1	3.2
52143-45	MACKEREL-PTR-000-1	10.0	2.5
52143-46	MACKEREL-PTR-000-2	24.0	2.2
52143-47	MACKEREL-PTR-000-3	12.3	4.1
52143-48	MACKEREL-PTR-000-4	15.8	2.6
52143-49	MACKEREL-PTR-000-5	9.95	2.2
52143-50	MACKEREL-PTR-000-6	52.2	7.2
52143-51	MACKEREL-PTR-000-7	9.03	10.5
52143-52	MACKEREL-PTR-000-8	5.01	1.1
52143-53	MACKEREL-PTR-000-9	18.7	3.5
52143-54	MACKEREL-PTR-000-10	13.8	5.2
52143-55	MACKEREL-PTR-6000-11	6.58	3.9
52286-06	MACKEREL-PR-500	2.18	4.3
52318-03A	SMELT-BD-000-5	8.07	11.8
52318-03B	Duplicate	5.72	17.1
52318-04	SMELT-BD-000-6	11.8	14.7
52318-05	SMELT-BD-000-7	11.5	20.6
52318-06	SMELT-BD-000-8	13.9	12.3
52318-07	SMELT-BD-000-9	8.96	21.6
52562-01A	TROUT-PV-005-2	11.3	38.3
52562-01B	Duplicate	12.1	32.0
52562-02	TROUT-PV-005-3	12.6	133
52562-03	TROUT-PV-005-4	17.0	25.0
52562-04	TROUT-PV-005-5	27.6	62.0
52562-05	TROUT-PV-005-6	57.0	247
52562-06	TROUT-BD-002-1	14.8	16.9
52562-07	TROUT-BD-002-2	19.0	33.7
52562-08	TROUT-BD-002-3	8.10	12.7
52562-09	TROUT-BD-002-4	18.7	61.8
52562-10	TROUT-BD-002-5	8.68	16.4
52562-11	TROUT-BD-002-6	16.9	17.4
52562-12	TROUT-BD-002-7	22.3	23.5
52562-13	TROUT-BD-002-8	19.2	17.8

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52562-14	TROUT-BD-002-9	29.1	23.0
52562-15	TROUT-BD-002-10	43.6	54.7
52562-16	TROUT-BD-6002-11	11.9	27.7
52562-17	MUSSEL-PV-000-1	834	7920
52562-18	MUSSEL-PV-000-2	884	7420
52562-19	MUSSEL-PV-000-3	936	6580
52562-20	MUSSEL-PV-000-4	722	9420
52562-21	MUSSEL-PV-000-5	680	2840
52562-22	MUSSEL-PV-000-6	772	13500
52562-23	MUSSEL-PTR-000-1	510	1140
52562-24	MUSSEL-PTR-000-2	441	935
52562-25	MUSSEL-PTR-000-3	665	2000
52562-26	MUSSEL-PTR-000-4	595	1900
52562-27	MUSSEL-PTR-000-5	685	2240
52562-28A	MUSSEL-PTR-000-6	515	925
52562-28B	Duplicate	625	1780
52562-29	MUSSEL-LBD2-000-1	1280	30200
52562-30	MUSSEL-LBD2-000-2	1640	24800
52562-31	MUSSEL-LBD2-000-3	1190	18000
52562-32	MUSSEL-LBD2-000-4	1090	17300
52562-33	MUSSEL-LBD2-000-5	1110	12700
52562-34	MUSSEL-LBD2-000-6	1690	12400
52564-01	CLAM-BD-000-01	148	3740
52564-02	CLAM-BD-000-02	101	2300
52564-03	CLAM-BD-000-03	62.5	1380
52564-04	CLAM-BD-000-04	76.0	1350
52564-05	CLAM-BD-000-05	61.5	1420
52564-06	CLAM-BD-6000-06	91.5	1810
52564-07	MUSSEL-BD-000-06	670	4310
52564-08	MUSSEL-LBD-000-06	2030	32800
52579-01	MUSSEL-BD-000-1	1510	24600
52579-02	MUSSEL-BD-000-2	565	2130
52579-03	MUSSEL-BD-000-3	675	3590
52579-04	MUSSEL-BD-000-4	691	3920
52579-05	MUSSEL-BD-000-5	1770	25900
52579-06	MUSSEL-LBD-000-1	510	1730
52579-07	MUSSEL-LBD-000-2	3040	124000
52579-08	MUSSEL-LBD-000-3	1850	20200
52579-09	MUSSEL-LBD-000-4	1820	51200
52579-10	MUSSEL-LBD-000-5	534	4180
52579-11	TROUT-PV-005-1	6.69	7.9
52579-12	SMELT-BD-000-1	4.25	6.9
52579-13	SMELT-BD-000-2	8.34	9.1
52579-14	SMELT-BD-000-3	4.46	7.3
52579-15	SMELT-000-4	30.0	26.2
52953-80	TROUT-PV-005-7	36.9	67.5
52953-81	TROUT-PV-005-8	65.8	68.7
52953-82	TROUT-PV-005-9	182	308

Analysis of Samples

RPC ID	Client ID	Cadmium	Lead
		Concentration (ng/g)	
52953-83	TROUT-PV-005-10	50.4	130
52953-84	TROUT-PV-005-11	63.9	103
52953-85	TROUT-PTR-006-1	22.9	181
52953-86	TROUT-PTR-006-2	28.7	31.2
52953-87A	TROUT-PTR-006-3	31.9	49.3
52953-87B	Duplicate	27.0	66.6
52953-88	TROUT-PTR-006-4	66.1	115
52953-89	TROUT-PTR-006-5	88.3	57.7
52953-90	TROUT-PTR-006-6	55.6	80.3
52953-91	TROUT-PTR-006-7	68.1	110
52953-92	TROUT-PTR-006-8	19.3	70.1
52953-93	TROUT-PTR-006-9	60.6	66.1
52953-94	TROUT-PTR-006-10	17.2	40.8
52953-95	TROUT-PTR-006-11	79.6	49.7
52953-96	SMELT-BD-351	25.1	81.9
52953-97	SMELT-BD-303	16.9	75.3
52953-98	SMELT-PV-402	25.5	34.6
52953-99	SMELT-PR-504	4.72	42.2
55364-01A	SMELT-LB-104	6.43	26.1
55364-01B	Duplicate	6.31	27.2
55364-02A	COD-LB-104	4.76	37.9
55364-02B	Duplicate	4.98	28.9

RPC
921 College Hill Rd,
Fredericton, N.B. E3B 6Z9
Report No.: 52143-IAS

Jacques Whitford Environment
PO Box 1116
Fredericton NB E3B 5C2
Attn: David Rae
Job No.: 1001701.01

November 07, 2005
Revised: December 06, 2005

Fax: 506.452.7652

Analysis of Soils

RPC ID	Client ID	Cadmium	Lead
		Concentration (mg/kg)	
RB1	QA/QC	< 0.05	< 0.5
RB2	QA/QC	< 0.05	< 0.5
RB3	QA/QC	< 0.05	< 0.5
RB4	QA/QC	< 0.05	< 0.5
RB5	QA/QC	< 0.05	< 0.5
RB6	QA/QC	< 0.05	< 0.5
RB7	QA/QC	< 0.05	< 0.5
NIST 2709A	CRM	0.32	12.2
NIST 2709B	CRM	0.39	17.5
NIST 2709C	CRM	0.35	13.0
NIST 2709D	CRM	0.32	13.4
NIST 2711A	CRM	38.8	1100
NIST 2711B	CRM	40.4	1030
NIST 2711C	CRM	39.0	1090
NIST 2711D	CRM	39.4	1200
52286-04A	SOIL-PV-414	1.02	64.1
52286-04B	Duplicate	1.05	59.0
52286-05	SOIL-PV-404	0.47	42.1
52286-07	SOIL-PR-504	0.60	65.3
52286-08	SOIL-PR-503	0.52	36.9
52286-09	SOIL-PR-6503	0.54	32.9
52286-16	SOIL-PV-413	0.78	48.6
52286-19	SOIL-BD-309	0.57	36.6
52286-20	SOIL-BD-309-2	2.17	131
52286-21	SOIL-BD-309-3	1.25	102
52286-38	SOIL-PV-411	1.83	85.7
52286-48A	SOIL-PR-500	1.33	32.1
52286-48B	Duplicate	1.24	39.0
52286-65	SOIL-PR-506	0.48	35.8
52286-66	SOIL-PR-6506	0.51	33.2
52291-01A	SOIL-PV-409	0.41	37.5
52291-01B	Duplicate	0.41	30.8
52291-02	SOIL-PV-409-2	0.95	35.0
52291-12	SOIL-PV-401	0.54	72.5
52291-15	SOIL-PV-403-1	0.81	46.4
52291-16	SOIL-PV-403-2	0.56	35.4
52291-17	SOIL-PV-415 BLANK	0.57	26.3
52291-24	SOIL-PV-406	0.64	44.4
52291-25	SOIL-PV-400	1.50	66.3
52291-34	SOIL-PV-405	0.68	30.9
52291-52	SOIL-PV-412 GARDEN1(G1)	0.75	44.7
52291-53	SOIL-PV-412 GARDEN2(G2)	1.23	122
52291-61	SOIL-PV-402-1	0.54	30.0
52291-62	SOIL-PV-402-2	0.62	28.1
52291-69	SOIL-PV-408	1.55	79.8
52291-75	SOIL-PV-407	0.97	92.0
52309-08A	SOIL-BD-311	0.77	43.3

Analysis of Soils

RPC ID	Client ID	Cadmium	Lead
		Concentration (mg/kg)	
52309-08B	Duplicate	0.68	43.4
52309-11	SOIL-BD-300	1.12	79.4
52309-13	SOIL-BD-306	1.03	103
52309-25	SOIL-BD-302	0.76	27.0
52309-35	SOIL-BD-308	1.42	82.1
52309-37	SOIL-BD-304	0.97	117
52309-41	SOIL-BD-303	0.40	89.2
52309-42A	SOIL-BD-310	0.82	62.0
52309-42B	Duplicate	0.89	71.8
52309-43	SOIL-PR-509	0.46	53.7
52309-96	SOIL-PR-510	1.07	151
52309-97	SOIL-PR-511	0.71	56.3
52310-01A	SOIL-LBD-125-1	1.47	115
52310-01B	Duplicate	1.47	130
52310-02	SOIL-LBD-125-2	1.01	138
52310-03	SOIL-LBD-123	0.58	59.5
52310-04	SOIL-LBD-121	1.26	117
52310-05	SOIL-LBD-119	1.10	70.3
52310-06	SOIL-LBD-117-1	2.37	219
52310-07	SOIL-LBD-117-2	1.63	113
52310-08	SOIL-LBD-115	10.2	561
52310-09	SOIL-LBD-113	2.71	179
52310-10	SOIL-LBD-111	3.74	194
52310-11	SOIL-LBD-109	2.16	158
52310-12	SOIL-LBD-105-1	3.14	190
52310-13	SOIL-LBD-105-2	2.17	105
52310-14	SOIL-LBD-100	1.06	75.1
52310-15	SOIL-TS-205-1	2.23	126
52310-16	SOIL-TS-205-2	1.78	112
52310-17	SOIL-TS-200	1.87	138
52310-18	SOIL-TS-202-1	4.19	1290
52310-19	SOIL-TS-202-2	2.33	202
52310-20	SOIL-TS-202-3	2.46	177
52310-21	SOIL-TS-201	1.78	106
52310-22	SOIL-TS-204	1.98	144
52310-23	SOIL-TS-207	1.48	97.8
52310-24	SOIL-TS-250*	1.50	126
52310-25	SOIL-TS-209	2.42	166
52310-26	SOIL-LBD-107	2.35	173
52318-02A	SOIL-PTR-599	0.47	28.2
52318-02B	Duplicate	0.45	27.0
52426-01A	SOIL-TS-216	1.42	104
52426-01B	Duplicate	1.09	82.2
52426-02	SOIL-LB-106	2.55	163
52426-03	SOIL-LB-104-1	2.38	130
52426-04	SOIL-LB-104-2	1.82	135
52426-05	SOIL-BD-316	0.69	50.4
52426-06	SOIL-TS-210	1.36	88.1

Analysis of Soils

RPC ID	Client ID	Cadmium	Lead
		Concentration (mg/kg)	
52426-07	SOIL-TS-212	0.85	53.2
52426-08	SOIL-TS-203	1.74	137
52426-09	SOIL-PR-514	0.53	37.1
52426-10	SOIL-TS-208	1.16	75.2
52426-11	SOIL-TS-206	1.44	128
52523-08A	SOIL-PR-507	0.80	50.8
52523-08B	Duplicate	0.73	49.8
52523-09	SOIL-PR-508	0.71	59.3
52523-10	SOIL-BD-312	0.86	62.7
52523-11	SOIL-BD-301	1.20	73.5
52523-12	SOIL-BD-6303	0.42	110
52523-13	SOIL-BD-305	0.63	28.8
52523-14	SOIL-BD-307	0.43	28.3
52523-15	SOIL-PR-501-1	1.30	77.3
52523-16	SOIL-PR-501-2	0.62	43.2
52523-17	SOIL-PV-410	1.40	91.6
52952-08A	SOIL-PR-505-1	0.78	85.8
52952-08B	Duplicate	0.73	81.5
52952-09	SOIL-PR-505-2	0.55	31.5
52953-14A	SOIL-LBD-150	2.08	136
52953-14B	Duplicate	2.11	140
52953-15	SOIL-LBD-151	1.13	112
52953-25	SOIL-TS-220	0.60	33.0
52953-32	SOIL-TS-220-2	0.50	29.4
52953-33	SOIL-TS-6220	0.46	27.9
52953-47	SOIL-BD-310	0.80	56.8
52953-48	SOIL-BD-6310	0.86	56.3
52953-56	SOIL-BD-351	0.91	47.6
52953-57	SOIL-BD-6351	0.94	52.1

APPENDIX F

Risk Assessment Update for Belldune Area
Prepared by SENES Consultants Limited

Jacques

FINAL

APPENDIX F

RISK ASSESSMENT UPDATE FOR BELLEDUNE AREA

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April 2006

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F1.0 INTRODUCTION

The New Brunswick Department of Health contracted SENES Consultants Limited to use the measured data collected by Jacques Whitford to substitute into the risk calculations that were carried out for the Belledune Area Health Study which was finished in 2005.

A review of the Jacques Whitford data indicated that only cadmium and lead were measured in samples of fish, mussels, garden vegetables, garden herbs and fruit; therefore, only these two contaminants were considered in the risk calculations described in this report. This assessment used the data provided by Jacques Whitford and no quality assurance or quality control checks were done. It was assumed that measured concentrations collected by Jacques Whitford are representative of concentrations in the corresponding study areas from where they were collected. This risk calculations presented in this appendix are for the current time period considering the average seafood eater.

F1.1 METHODOLOGY

The revised Exposure Point Concentrations (EPCs) for fish mussels and backyard vegetables were based on data provided by Jacques Whitford. No attempt was made to combine the previous dataset used in the Belledune Area Health Study (Goss Gilroy 2005) with the current dataset. In the case of backyard vegetables and mussels, a different methodology than previously used has been adopted for EPC calculations since only measured data are used. Instead of developing EPCs for vegetables using a statistical model relationship with predicted air concentrations and the mussel EPCs using a statistical model relationship with the distance from the outfall, the revised EPCs for lead and cadmium were based on a summary of Jacques Whitford measurement data.

The EPC calculations were developed in the following manner:

- Measured fish data for mackerel and smelts were used to substitute the fish data that were used in the current time period for the Belledune Area Health Study. Even though fish were collected in different areas of the Baie des Chaleurs between Petit-Rocher and Belledune, all the data for mackerel and smelts collected by Jacques Whitford was pooled in the assessment as was done in the previous assessment. The mean of the data was used for the Best Estimate and the 95th percentile Upper Confidence Limit of the mean was used for the Upper Bound Estimate. Data on trout that were caught in freshwater rivers were pooled with the marine fish in a separate analysis as requested by the New Brunswick Department of Health. The Best Estimate and Upper Bound concentrations developed for this combined dataset used the same methodology as for the marine fish.

- Measured mussel data from the 2005 sampling campaign were used to substitute the previous data that were used in the Belledune Area Health Study. No attempt was made to combine the datasets. It should be noted that there were no mussel data for Townsite #2 and as such the EPCs for mussels developed in the previous assessment were used. The mussel data for Lower Belledune combined with the (remainder of) Belledune area was used to derive Belledune EPCs. For Lower Belledune, the mean and maximum concentration of the measured data was used for the Best Estimate and Upper Bound exposure, respectively, since not a lot of data have been collected. For Belledune, Pointe-Verte and Petit-Rocher, the mean and UCL of the mean was used. Clam data provided by Jacques Whitford were not used. A separate exposure assessment was carried out using the EPCs for mussels derived from the 2005 Belledune Area Health Study.
- Root vegetable data from Jacques Whitford were used for the root vegetables, above ground exposed and above ground protected data from Jacques Whitford were used for the above ground vegetables. The fruit data collected were considered in a separate assessment. However, the herb data collected were not used in the calculations as they were not considered in the previous assessment and they represent a very small fraction of an individual's diet. The statistics used for the vegetables were as follows: The mean and 95th percentile concentrations were used for Townsite#2 and Lower Belledune and the mean and UCL were used for Pointe-Verte, Petit-Rocher and Belledune. The data for Townsite #2, Lower Belledune and the remainder of Belledune were combined to get the EPCs for the Belledune area.

F1.2 ASSUMPTIONS AND LIMITATIONS TO ASSESSMENT

This assessment only provides results for exposures to cadmium and lead whereas the previous assessment considered other metals.

A cursory review of the data indicates that the data for cadmium in vegetables and fish are similar to those collected in previous campaigns; however, the data available for lead was about an order of magnitude lower than those previously measured for vegetables and three orders of magnitude lower for fish. The previous fish data was collected in the 1980's; however, the vegetable data are more recent. The inconsistency in the data is a concern since there seems to be a marked difference between this new data and other data collected in the study area (Noranda). Jacques Whitford has indicated that they are confident in the data provided and therefore, these data were used in the assessment.

The data provided for development of EPCs for mussels were fewer than those used in the Belledune Area Health Study (2005). In addition, there was also less coverage in the areas. Therefore, the EPCs developed using the measured data are more uncertain. Another assessment was done using the EPCs for lead and cadmium in mussels from the Belledune Area Health Study to examine the effects of this uncertainty.

It has been assumed that the Jacques Whitford measured data were representative of the different study areas; however, it should be noted that the size of the samples indicate that this assumption may not be appropriate and may result in uncertainty in the assessment.

This appendix, provides analyses involving freshwater fish and backyard fruit. Data for these two media were not available in the previous assessment. Therefore caution needs to be exercised in comparing the results which include these media with previous results from the Belledune Area Health Study.

F.2.0 CALCULATION OF EXPOSURE POINT CONCENTRATIONS (EPCs)

F.2.1 DATA SOURCE

Concentrations of cadmium and lead in produce, fish and shellfish from the study area were measured in 2005 and are reported in the main body of this report. The measurements were classified by categories (e.g. below ground vegetables, fish) and study area (e.g. Lower Belledune, Pointe-Verte). For many categories, there were several species measured (e.g. carrot and beet for below ground vegetables). The samples were assumed to be quality assured (QA/QC) and representative of the range of concentrations within each study area.

As discussed in Section F.1.2, not all measurements from the 2005 sampling program were used to calculate EPCs.

- Measurements from control locations were not used as neither cadmium nor lead are known carcinogens and risk assessment for non-carcinogens is based on total concentrations (i.e. include background).
- Soil concentrations were not used as revisions to soil EPCs were not required.
- Concentrations in clams were not considered.
- The concentrations of depurated mussels were not included as these concentrations tend to be lower than the non-depurated mussels.
- Samples of herbs (e.g. dill, parsley, chives, basil) were not included since they account for a negligible proportion of the mass of food consumed from backyard gardens.

Table F2.1 shows the number of samples analyzed by category and study area following the exclusions noted above.

TABLE F2.1
NUMBER OF SAMPLES BY CATEGORY AND STUDY AREA

Type[a]	Remainder of Belledune[b]	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher	All
Vegetables and Fruit						
Above Ground Exposed (AE)	25	16	14	26	19	100
Above Ground Protected (AP)	25	11	12	19	25	92
Below Ground (B)	25	15	25	27	42	134
Fruit (F)	24	18	27	20	22	111
Seafood						
FRESHWATER FISH	11	.	.	11	11	33
MARINE FISH	33	.	11	12	13	69
MUSSEL	5	.	10	5	5	25

Note:

[a] Sample Type as reported by Jacques Whitford.

[b] Remainder of Belledune are samples from Belledune collected outside the Townsite #2 and Lower Belledune.

F.2.2 Classification of 2005 Sample Data to Risk Assessment Categories and Study Areas

The data from the 2005 sampling program were assigned to risk assessment media categories according to Table F2.2. Based on 2005 sampling program, two new media categories were defined for risk assessment. A fruit category for backyard produce and a combined marine and freshwater fish category were added.

TABLE F2.2
CORRESPONDENCE BETWEEN 2005 MEDIA CATEGORIESAND RISK ASSESSMENT MEDIA

2005 Sampling Program Category	Risk Assessment Media
Below ground produce (B)	ROOT
Above ground produce (AP) and above exposed (AE)	OTHER
Fruits (F)	FRUIT*
Mussels	Mussels
Marine Fish (mackerel and smelt)	Fish
Marine and Freshwater Fish (mackerel, smelt and trout)	FishBoth*

Note:
*: Category not previously considered.

Table F2.3 summarizes the number of samples that were used to calculate EPCs by media category and study area.

TABLE F2.3
NUMBER OF SAMPLES USED TO CALCULATE EPCs BY CATEGORY AND STUDY AREA

Type	Remainder of Belledune	Belledune	Townsite #2	Lower Belledune	Pointe-Verte	Petit-Rocher	Combined
FRUIT	24	69[a]	18	27	20	22	.
Fish	.	.	.	.	.	.	69
FishBoth	.	.	.	.	.	.	102
Mussels	5	15[b]		10	5	5	.
OTHER	50	103[a]	27	26	45	44	.
ROOT	25	65[a]	15	25	27	42	.

Note:
[a] concentrations from Lower Belledune, Townsite #2 and remainder of Belledune combined together.
[b] concentrations from Lower Belledune and remainder of Belledune.

Produce and mussel EPCs are specific to each study area. The representative concentration data for Belledune were created by grouping together the concentrations from Townsite #2 (TS), Lower Belledune (LBD) and the remaining area of Belledune (BD). There were no mussel data for Townsite #2 (TS) in the 2005 program; therefore, the EPCs were based on the previous assessment. The EPC for fish are considered the same for all study areas so the measurements were combined into an all location combined grouping.

F.2.3 CALCULATION OF EPCs

The best estimate of EPCs was defined as the mean, or average concentration for each study area. The upper bound estimates of EPC for the Belledune, Pointe-Verte and Petit Rocher study areas were calculated as the upper limit[1] of an approximate two-sided 95% confidence interval on the mean concentrations. For Townsite #2 and Lower Belledune, the upper bound estimate, for assessment of the maximum exposed individual, was calculated as the 95th percentile[2] or, if there were less than 19 measurements, as the maximum measured concentration in the study area. The use of the 95th percentile concentration statistic is supported by Health Canada and is considered to be representative of the maximum concentration. As a result, the maximum concentration was used for mussels in Lower Belledune and for fruit and root vegetables in Townsite #2. For fish EPCs, the best and upper bound estimates were calculated as the mean and the approximate upper confidence limit of a two-sided 95% confidence interval of the combined data.

The distribution of individual data and the EPCs calculated from the data are shown in Figures F2.1 and F2.2. The range of individual concentrations is shown using box and whisker plots. The box shows the range of data between the 25th percentile and 75th percentiles with the vertical lines extending downwards to the 5th percentile and upwards to the 95th percentile. The more extreme, or the highest and lowest, concentrations are shown by asterix. The plots show there is substantial variation in concentrations; for example, the concentrations in OTHER vegetables vary by more than a factor of 1000 within a study area. The best (mean) and upper bound EPC estimates (maximum, 95th percentile or 95th UCL) are shown by lines joining the box and whisker plots.

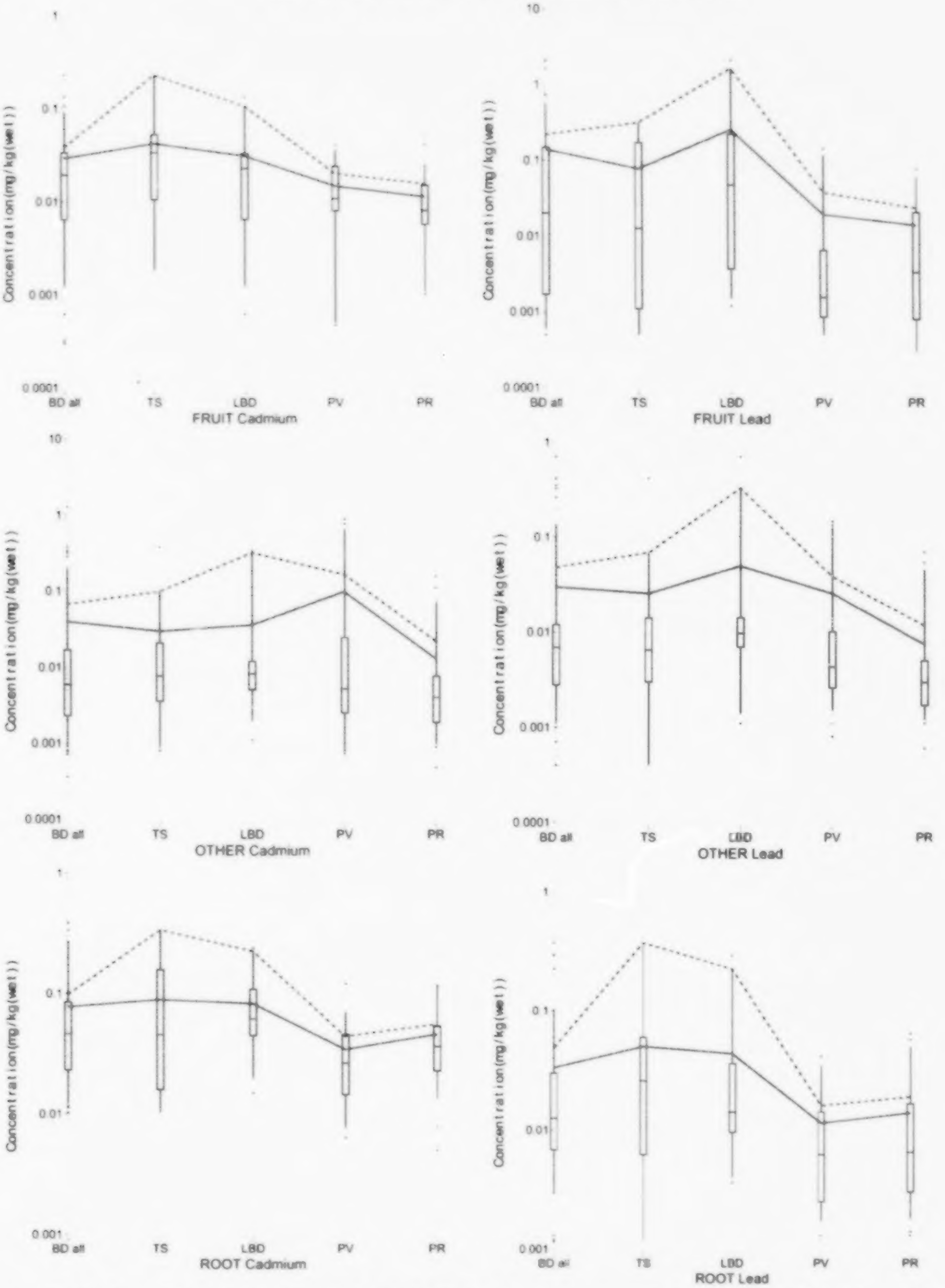
From Figure F2.1 it can be seen that typically, the highest measured concentrations and the highest best estimate EPCs are in Townsite #2 and Lower Belledune. Figure F2.2 shows the calculated EPCs and the distribution of measured concentrations for mussels and fish. Note the EPCs for fish are the same regardless of study area. The figures do not show the EPCs for mussels for the Townsite #2 study area since no measurements were collected as part of the 2005 sampling program.

---

[1] Using PROC SUMMARY in SAS Version 8. Since the data are not normally-distributed these are approximate confidence intervals.

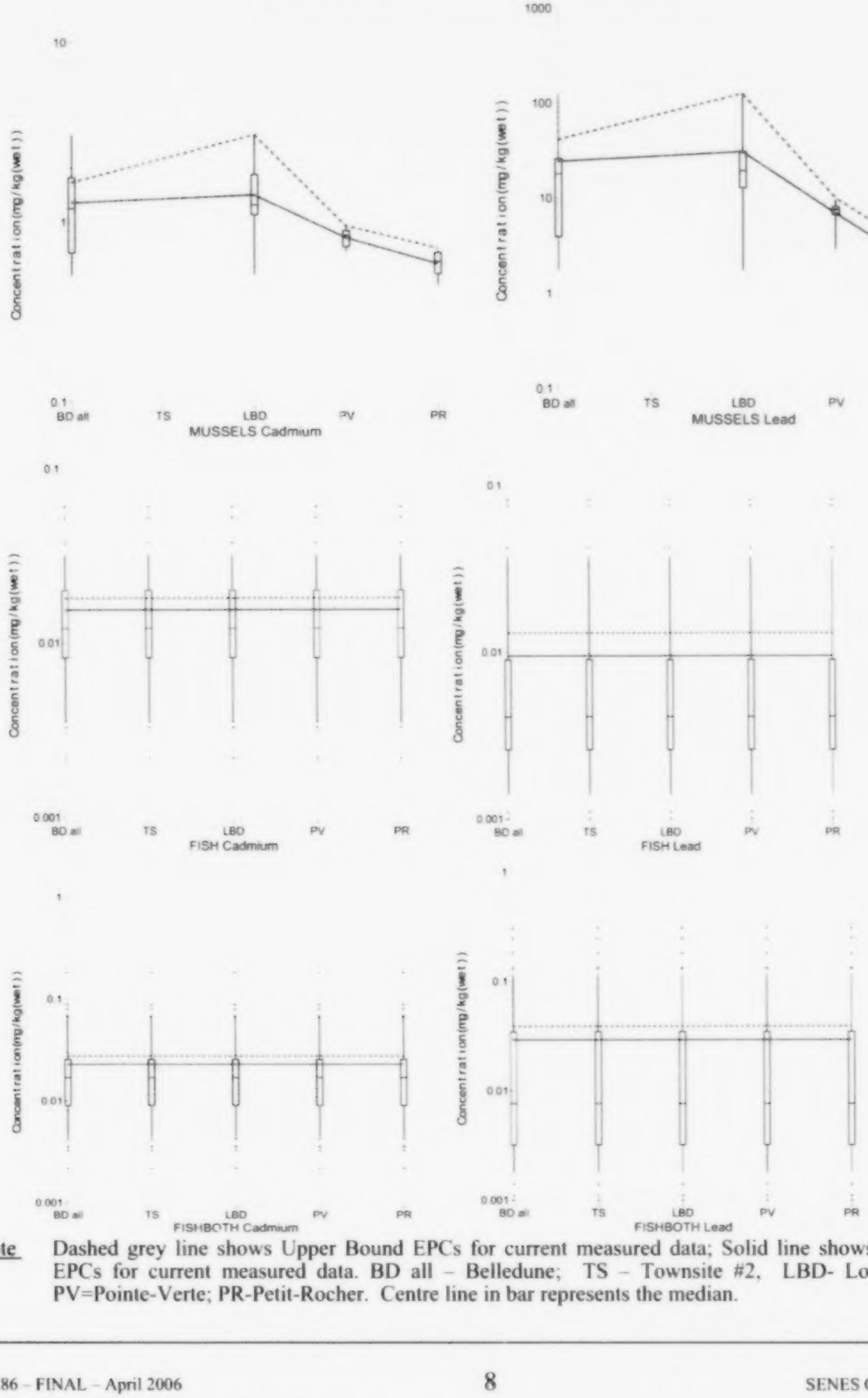
[2] Using PROC UNIVARIATE in SAS Version 8 using the default method of empirical distribution function.

FIGURE F2.1
GARDEN PRODUCE EPCs AND DISTRIBUTION OF MEASURED CONCENTRATIONS



Note Dashed grey line shows Upper Bound EPCs of current measured data; Solid line shows Best Estimate EPCs of current measured data. BD all – Belledune; TS – Townsite #2, LBD- Lower Belledune, PV=Pointe-Verte; PR-Petit-Rocher. Centre line in bar represents the median.

FIGURE F2.2
MUSSEL AND FISH EPCs AND DISTRIBUTION OF MEASURED CONCENTRATIONS



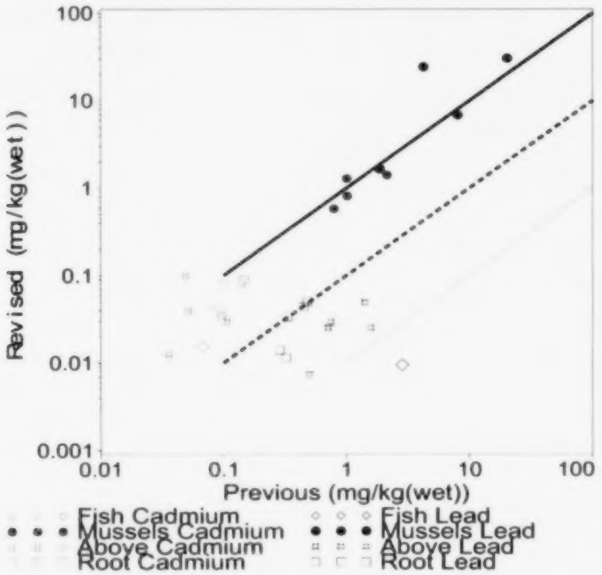
Note Dashed grey line shows Upper Bound EPCs for current measured data; Solid line shows Best Estimate EPCs for current measured data. BD all – Belledune; TS – Townsite #2, LBD- Lower Belledune, PV=Pointe-Verte; PR-Petit-Rocher. Centre line in bar represents the median.

F.2.4 COMPARISON TO PREVIOUS EPCs

Figure F2.3 shows a comparison between the best estimate (average) EPCs calculated using the 2005 measurements and the previous EPCs. Typically, the best estimate EPCs for cadmium that have been calculated with the recent data are similar or slightly lower compared to the previous EPCs; however, there are substantial differences for lead particularly for vegetable produce and for fish. For backyard produce, the best estimate EPCs for lead are a factor of 10 or more, lower than previously estimated. The best estimate EPC for lead in fish is more than a factor of 100 lower than the previous EPC. The reason for lower lead concentrations in vegetable produce is unknown; however, the concentrations of lead in fish were expected to be lower, in part, because the previous EPCs were based on concentrations measured in the 1980s.

Best estimate EPCs for lead in mussels are substantially higher than previously estimated for one study area. This may be due, in part, to large proportion of samples from Lower Belledune used in the estimate for Lower Belledune and, in part, by the change in methodology. This occurs to a smaller degree with cadmium in mussels. Therefore, a separate exposure assessment was done with using the mussel EPC data from the 2005 Belledune Area Health Study to explore the uncertainty in the 2005 measurement data.

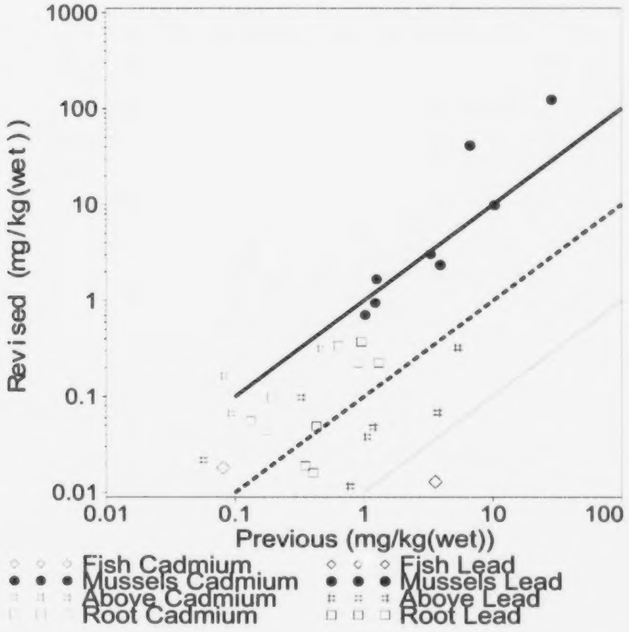
FIGURE F2.3
COMPARISON BETWEEN REVISED AND PREVIOUS BEST ESTIMATE EPCs



Notes:
i) solid dark line shows agreement between revised and previous EPCs.
ii) dashed line shows revised EPCs are a factor of 10 lower than previous EPCs.
iii) solid gray line shows revised EPC are a factor of 100 lower than previous EPCs

A similar pattern was present for upper bound estimates as can be seen in Figure F2.4. Again lead EPCs for fish and backyard produce are lower than previously estimated. The EPCs for mussels in some study areas are higher than previously estimated. This is due partly to the lower number of measurements and the change in methodology.

FIGURE F2.4
COMPARISON BETWEEN REVISED AND PREVIOUS UPPER BOUND EPCs



Notes: i) solid dark line shows agreement between revised and previous EPCs.
ii) dashed line shows revised EPCs are a factor of 10 lower than previous EPCs.
iii) solid gray line shows revised EPC are a factor of 100 lower than previous EPCs.

F.2.5 EPCs USED FOR RISK ASSESSMENT

Table F2.4 summarizes the best estimate EPC for mean (average) concentrations in each study area.

TABLE F2.4
BEST ESTIMATE EPCs (mg/kg(wet))

COPC	Townsite #2	Lower Belledune	Belledune	Pointe-Verte	Petit-Rocher
FRUIT					
Cadmium	0.042	0.031	0.029	0.015	0.011
Lead	0.077	0.25	0.14	0.019	0.014
FISH					
Cadmium	0.015	0.015	0.015	0.015	0.015
Lead	0.0095	0.0095	0.0095	0.0095	0.0095
FISHBOTH					
Cadmium	0.023	0.023	0.023	0.023	0.023
Lead	0.029	0.029	0.029	0.029	0.029
MUSSELS					
Cadmium	0.81[a]	1.4	1.3	0.81	0.58
Lead	1.3[a]	30	27	6.8	1.6
OTHER					
Cadmium	0.029	0.035	0.039	0.097	0.013
Lead	0.025	0.049	0.03	0.025	0.0074
ROOT					
Cadmium	0.089	0.082	0.078	0.034	0.046
Lead	0.05	0.044	0.033	0.011	0.014

Note:
[a] EPC from previous assessment since no data collected from this area in 2005.
FISHBOTH is a pooled data set of marine and freshwater fish.

Table F2.5 summarizes the upper bound estimate EPC for each study area. For Townsite #2 and Lower Belledune areas, the estimates are for the maximally exposed individual (i.e. the highest concentration within the area). For Belledune, Pointe-Verte and Petit-Rocher, the upper bound estimate is the approximate upper confidence limit of the mean (average) concentration in the study area.

TABLE F2.5
UPPER BOUND ESTIMATE EPCs (mg/kg(wet))

COPC	Townsite #2	Lower Belledune	Belledune	Pointe-Verte	Petit-Rocher
FRUIT					
Cadmium	0.23	0.11	0.038	0.02	0.016
Lead	0.31	1.6	0.22	0.037	0.023
FISH					
Cadmium	0.018	0.018	0.018	0.018	0.018
Lead	0.013	0.013	0.013	0.013	0.013
FISHBOTH					
Cadmium	0.028	0.028	0.028	0.028	0.028
Lead	0.039	0.039	0.039	0.039	0.039
MUSSELS					
Cadmium	1.3[a]	3	1.6	0.95	0.71
Lead	3.6[a]	120	40	9.9	2.4
OTHER					
Cadmium	0.098	0.32	0.066	0.16	0.022
Lead	0.068	0.32	0.048	0.038	0.012
ROOT					
Cadmium	0.34	0.22	0.098	0.044	0.056
Lead	0.37	0.23	0.049	0.016	0.019

Note:

[a] EPC from previous assessment since no data collected from this area in 2005.

FISHBOTH is a pooled data set of marine and freshwater fish.

F3.0 RECEPTOR CHARACTERISTICS

The same receptor characteristics as used in the previous assessment were used. However, consumption of backyard garden fruit was not considered previously.

To summarize, fish and shellfish intake values were derived from The New Brunswick Nutrition Survey (2004). All other intake rates were obtained from Health Canada (2003).

The Ontario Ministry of the Environment in their document entitled *Soil Investigation and Human Health Risk Assessment for the Rodney Street Community, Port Colborne* (October 2001), derived the percentage of the vegetable intake that an individual would obtain from a backyard garden. From their calculations they determined that 7.3% of total annual consumption of vegetables comes from backyard gardens. This value was adopted in this assessment. This document also indicates that 2.91% of fruits and juices would be obtained from a home garden. This value was selected for use in this assessment.

Table F3.1 provides a summary of the dietary characteristics used in the assessment. All of the dietary components were assumed to be obtained from the Belledune area. Supermarket exposures were considered as part of baseline exposures.

TABLE F3.1
SUMMARY OF DIETARY CHARACTERISTICS CONSIDERED FOR THIS ASSESSMENT

Receptor Characteristic	Infant	Toddler	Child	Teen	Adult	Source/Rationale
Age	0 – 6 mo	7 mo. – 4yr	5 – 11 yr	12 – 19 yr	20+ yr	HC 2003*
Total Daily Consumption of Root Vegetables (g/d)	83.0	105.0	161.0	227.0	188.0	Richardson 1997*
Daily Consumption of Backyard Root Vegetables (g/d)	6.06	7.67	11.8	16.6	13.7	Applied MOE factor of 7.3% for backyard produce
Total Daily Consumption of Other Vegetables (g/d)	72.0	67.0	98.0	120	137	Richardson 1997*
Daily Consumption of Other Backyard Vegetables (g/d)	5.26	4.89	7.15	8.76	10.0	Applied MOE factor of 7.3% for backyard produce
Total Daily Consumption of Fruits and Juices (g/d)	136.0	234.0	268.0	258.0	245.0	Richardson 1997*
Daily Consumption of Backyard Fruits and Juices (g/d)	3.96	6.81	7.80	7.5	7.1	Applied MOE factor of 2.91% for backyard fruits and juices
Daily Consumption of Fish (g/d) – mean	0.5	2.64	13.7	13.7	18.5	Based on NB Nutrition Survey
Daily Consumption of Fish (g/d) – max	-	-	-	-	222.0	Based on NB Nutrition Survey
Daily Consumption of Shellfish (g/d) – mean	-	-	4.63	4.63	6.25	Based on NB Nutrition Survey
Daily Consumption of Shellfish (g/d) – max	-	-	-	-	173.8	Based on NB Nutrition Survey
Daily Consumption of Lobster (g/d) – mean	-	0.28	1.30	1.30	1.75	Based on NB Nutrition Survey
Daily Consumption of Lobster (g/d) – max	-	-	-	-	84.0	Based on NB Nutrition Survey
Daily Consumption of wild game (g/d)	-	4.25	6.25	8.75	13.5	Richardson 1997 based on First Nations populations eaters only and applied a factor of 5%

*Source: Health Canada 2003.

F4.0 SUMMARY OF EXPOSURE FINDINGS USING CURRENT MEASURED DATA

This section contains the summary of findings for current measured exposure levels of cadmium and lead in backyard vegetables, fish and mussels. In order to describe the potential range of exposures and the associated potential health risks, the findings are presented with a description of the both the "best estimate" and "upper-bound" exposures according to the various receptor age groups (e.g. infant, toddler, child, teen, adult), local seafood consumption, and various sites (e.g., Townsite #2, Pointe-Verte). The results that are presented for exposures other than vegetables, fish and mussels are based on the Noranda Environmental Monitoring Program data as was done in the 2005 Belledune Area Health Study. The adult and child exposures are provided in figures as an example, the other life stages are provided in a tabulated form. As discussed above, several different analyses were performed as follows:

- Assessment 1 - Analysis using measured EPCs for marine fish, mussels and backyard vegetable data – a direct substitute of the previous assessment.
- Assessment 2 - Analysis using measured EPCs for marine fish and backyard vegetable data and the EPCs for mussels that were used in the previous assessment – to explore uncertainty in current measured mussel EPCs
- Assessment 3 - Analysis using measured EPCs for marine and freshwater fish, mussels and backyard vegetable data – consideration of consumption of both marine and freshwater fish in the study area.
- Assessment 4 - Analysis using measured EPCs for marine fish, mussels and backyard vegetable data as well as consideration of EPCs for fruit – addition of another pathway of exposure.

F4.1 CADMIUM EXPOSURE

F4.1.1 Assessment 1 - Cadmium Exposure

As seen from Figure F4.1, best estimate or average environmental concentrations result in exposures for all locations that are below the oral TRV for cadmium. Supermarket foods account for the majority of the exposure. The inhalation pathway is insignificant and as such a comparison of the intakes of the oral TRV is appropriate. At the upper bound estimates (Figure F4.2), exposures for children in Townsite #2, Lower Belledune and Belledune exceed the TRV. The primary pathway of exposure is supermarket food. Consumption of wild mussels is also a major pathway. At the upper bound estimates, infants, toddlers and teens do not exceed the oral TRV.

FIGURE F4.1
PREDICTED INTAKES OF CADMIUM (BEST ESTIMATE) – ASSESSMENT 1

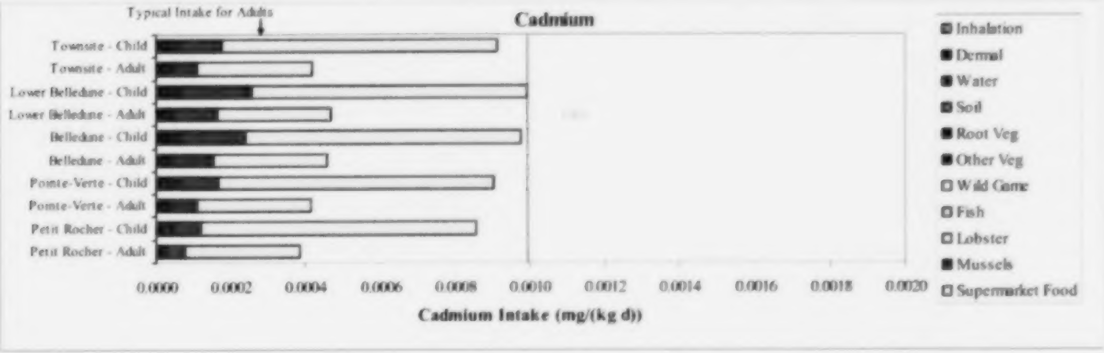
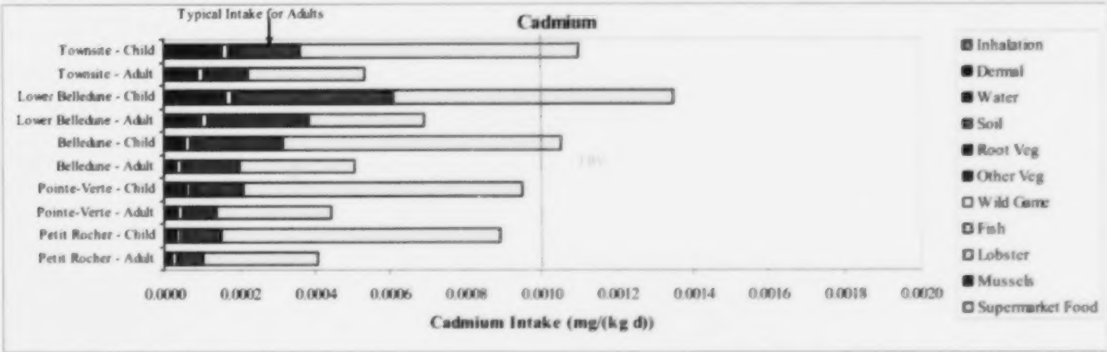


FIGURE F4.2
PREDICTED INTAKES OF CADMIUM (UPPER BOUND) – ASSESSMENT 1



F4.1.2 Assessment 2 - Cadmium Exposure

This assessment used the mussel data used in the previous Health Study and the new measured data for fish and backyard vegetables. As seen from Figure F4.3, best estimate or average environmental concentrations result in exposures for all locations that are below the oral TRV for cadmium, except for the child in Lower Belledune. This is due to differences in the cadmium mussel EPC concentrations. Table F4.1 provides a summary of the EPC concentrations in mussels developed for the previous risk assessment as well as those developed from the 2005 sampling program. As seen in the table, in Lower Belledune, the EPC concentration from the previous assessment was 2.1 mg/kg (ww) versus 1.4 mg/kg (ww) from the 2005 measured data. This difference accounts for whether the TRV is exceeded or not. This is because mussels are a significant exposure pathway and there still seems to be uncertainty in the development of the EPC for this pathway. The upper bound estimate (Figure F4.4) is similar to the upper bound estimate for Assessment 1 (see Figure F4.2), except for the child in Belledune where the TRV is not exceeded.

TABLE F4.1
COMPARISON OF CADMIUM EPCs IN MUSSELS BETWEEN PREVIOUS AND CURRENT ASSESSMENT

Location	Mussels EPC (mg/kg wet)	
	Previous	**Revised**
Cadmium - Best Estimate		
Belledune	1.0	1.3
Lower Belledune	2.1	1.4
Petite Rocher	0.79	0.58
Pointe-Verte	1.01	0.81
Townsite	0.81	0.81
Cadmium - Upper Bound		
Belledune	1.3	1.7
Lower Belledune	3.3	3.0
Petite Rocher	1.03	0.71
Pointe-Verte	1.23	0.95
Townsite	1.3	1.3

FIGURE F4.3
PREDICTED INTAKES OF CADMIUM (BEST ESTIMATE) – ASSESSMENT 2

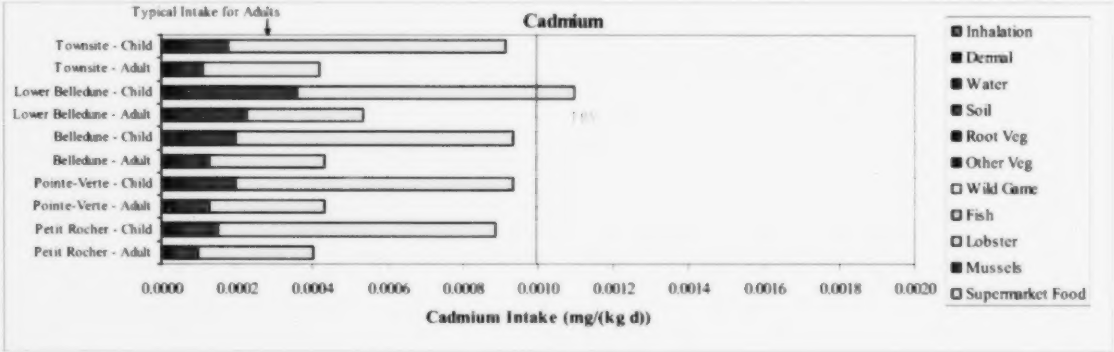
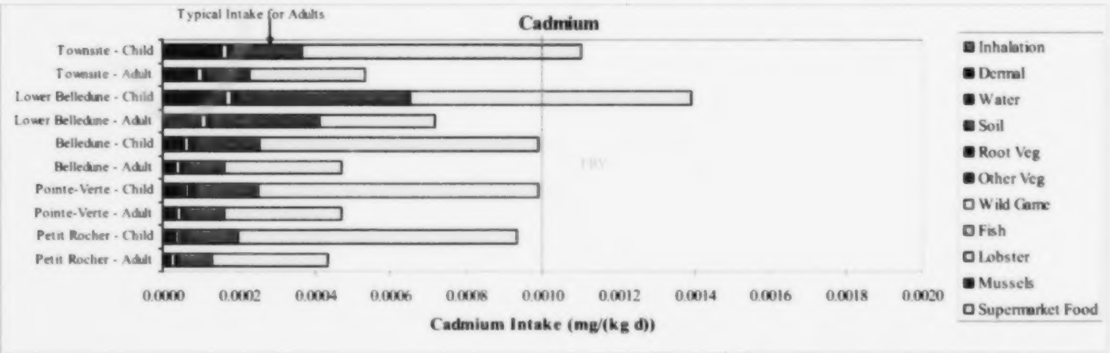


FIGURE F4.4
PREDICTED INTAKES OF CADMIUM (UPPER BOUND) – ASSESSMENT 2



F4.1.3 Assessment 3 - Cadmium Exposure

As seen from Figures F4.5 and F4.6, the addition of the freshwater fish data to the marine fish data does not change the results very much from the Assessment 1 scenario. This is because the fish exposure pathway is relatively insignificant compared to the mussel and supermarket food exposure pathways.

FIGURE F4.5
PREDICTED INTAKES OF CADMIUM (BEST ESTIMATE) – ASSESSMENT 3

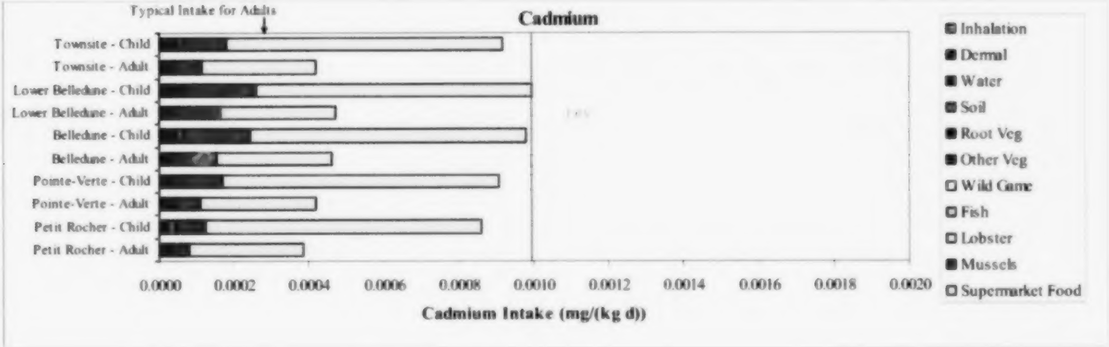
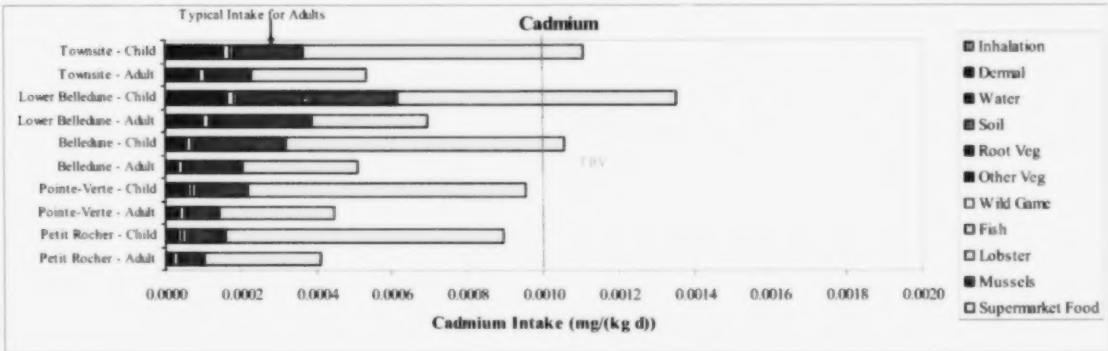


FIGURE F4.6
PREDICTED INTAKES OF CADMIUM (UPPER BOUND) – ASSESSMENT 3



F4.1.4 Assessment 4 - Cadmium Exposure

As seen from Figures F4.7 and F4.8, the addition of the fruit exposure pathway data does not change the results very much from the Assessment 1 scenario. This is because the fruit exposure pathway is relatively insignificant compared to the mussel and supermarket food exposure pathways.

FIGURE F4.7
PREDICTED INTAKES OF CADMIUM (BEST ESTIMATE) – ASSESSMENT 4

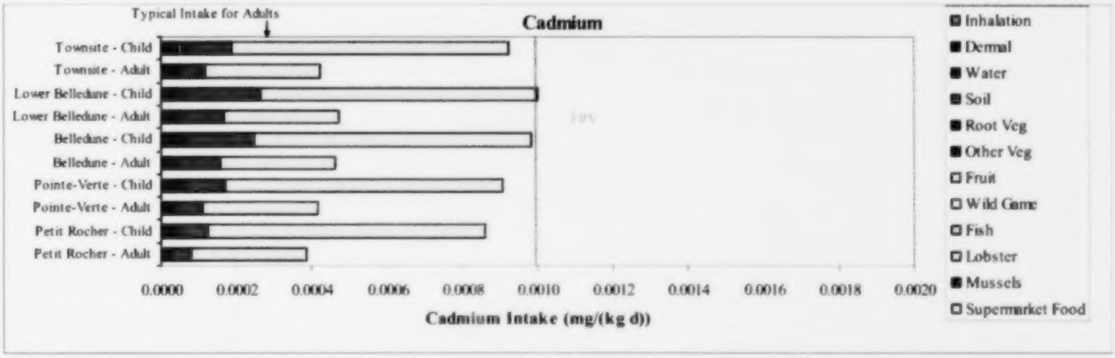
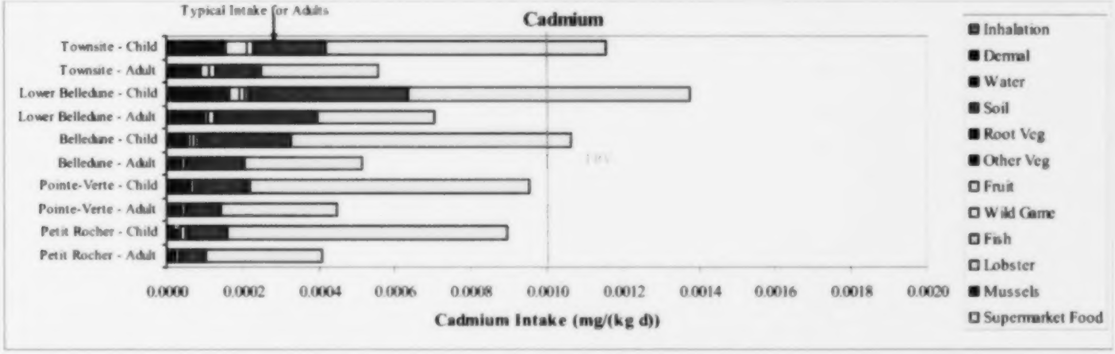


FIGURE F4.8
PREDICTED INTAKES OF CADMIUM (UPPER BOUND) – ASSESSMENT 4



F4.2 LEAD EXPOSURE

F4.2.1 Assessment 1 - Lead Exposure

Figure F4.9 demonstrates that the best estimates or average environmental concentrations result in exposures for child and adult receptors that are below the oral TRV with the exception of children in Lower Belledune and Belledune. The major pathways of exposure for children in Lower Belledune and Belledune are consumption of local wild mussels. As discussed in Section F2, there is large uncertainty surrounding the EPC developed for mussels using data from the current sampling program due to the small sample size. The large exposure commitment to fish in the previous assessment has been reduced with the current measured lead levels in fish. The TRV is not exceeded for infants and toddlers using the best estimate EPCs. At the upper bound estimate, there are several more receptors that have exposures that exceed the oral TRV. Again, the consumption of local wild mussels dominates the exposures. The supermarket food intakes are not a predominant pathway in the exposure of lead.

Although not illustrated here, the upper bound exposures for the teen in Belledune also exceeds the lead TRV. Mussel consumption accounts for the majority of the teen exposure. As seen from the figures, all other pathways of exposure are relatively minor.

FIGURE F4.9
PREDICTED INTAKES OF LEAD (BEST ESTIMATE) – ASSESSMENT 1

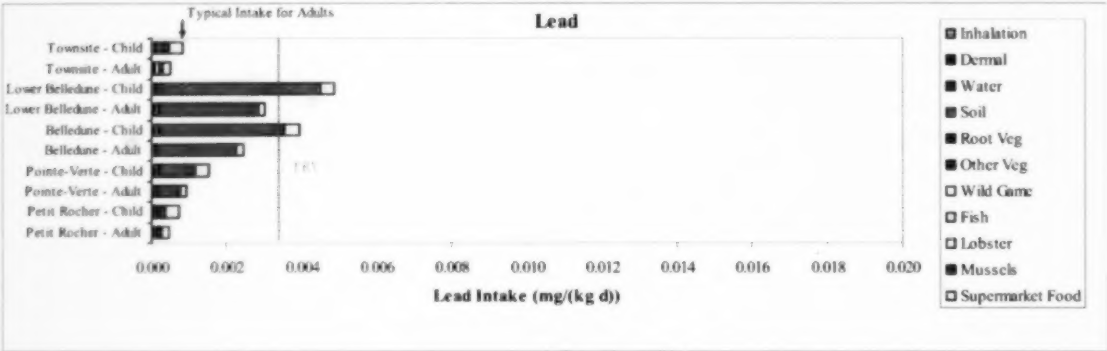
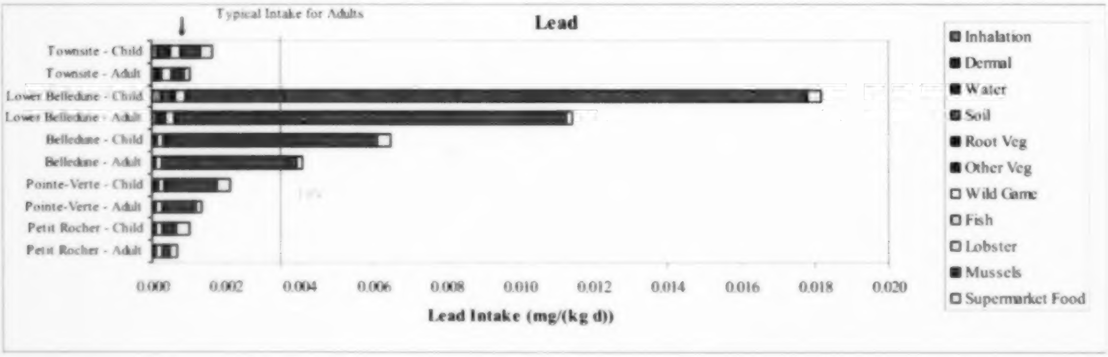


FIGURE F4.10
PREDICTED INTAKES OF LEAD (UPPER BOUND) – ASSESSMENT 1



F4.2.2 Assessment 2 - Lead Exposure

If the previous EPC mussel lead concentrations are used the results are quite different. As seen from Figure F4.11, all the predicted intakes for lead exposure under this scenario are below the TRV. This is due to the differences in the lead concentrations in mussels. As seen from Table F4.2, the mussel EPC concentrations from the previous program are substantially lower than those developed from the 2005 sampling program. Since mussel exposure represents the largest pathway, similar differences are also seen at the upper bound concentrations (see Figure F4.12).

TABLE F4.2
COMPARISON OF LEAD EPCs IN MUSSELS BETWEEN PREVIOUS AND CURRENT ASSESSMENT

Location	Mussels EPC (mg/kg wet)	
	Previous	**Revised**
Lead - Best Estimate		
Belledune	4.23	24
Lower Belledune	20.3	30.0
Petite Rocher	1.9	1.6
Pointe-Verte	8.0	6.8
Townsite	1.3	1.3
Lead - Upper Bound		
Belledune	6.7	41
Lower Belledune	28.7	120
Petite Rocher	3.9	2.4
Pointe-Verte	10.3	9.9
Townsite	3.6	3.6

FIGURE F4.11
PREDICTED INTAKES OF LEAD (BEST ESTIMATE) – ASSESSMENT 2

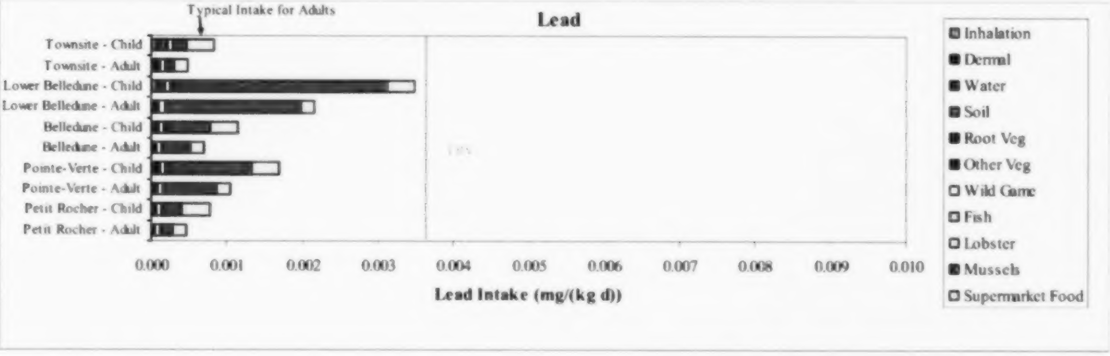
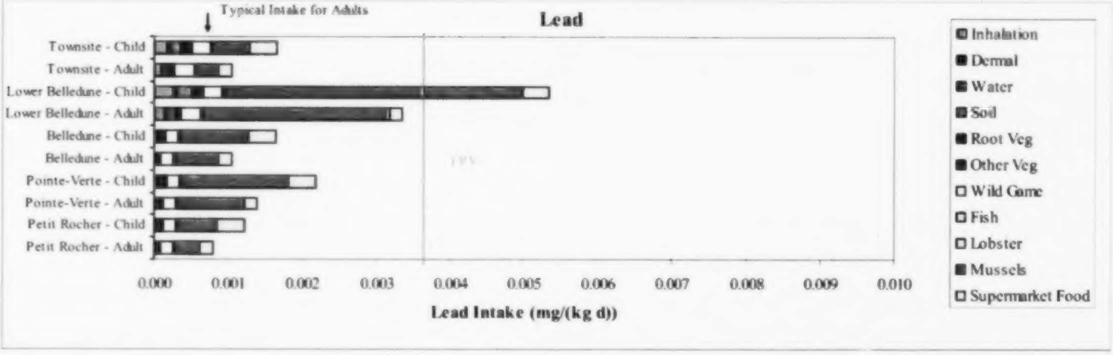


FIGURE F4.12
PREDICTED INTAKES OF LEAD (UPPER BOUND) – ASSESSMENT 2



F4.2.3 Assessment 3 - Lead Exposure

As seen from Figures F4.13 and F4.14, the addition of the freshwater fish data to the marine fish data does not change the results very much from the Assessment 1 scenario. This is because the fish exposure pathway is relatively insignificant compared to the mussel exposure pathways.

FIGURE F4.13
PREDICTED INTAKES OF LEAD (BEST ESTIMATE) – ASSESSMENT 3

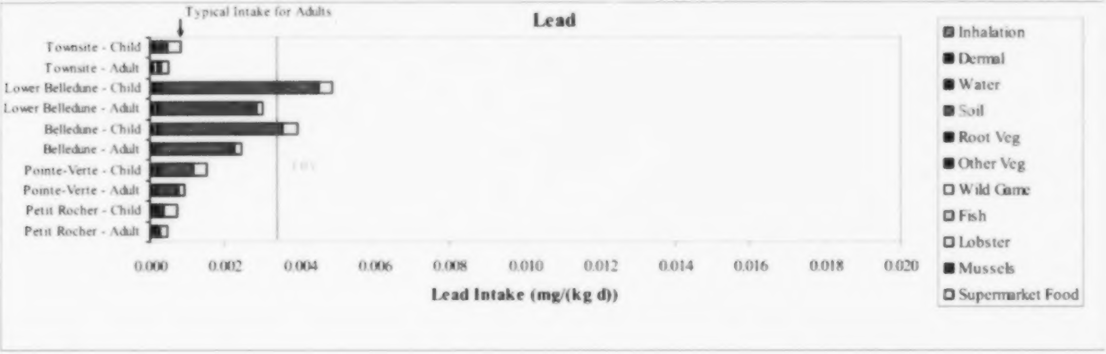
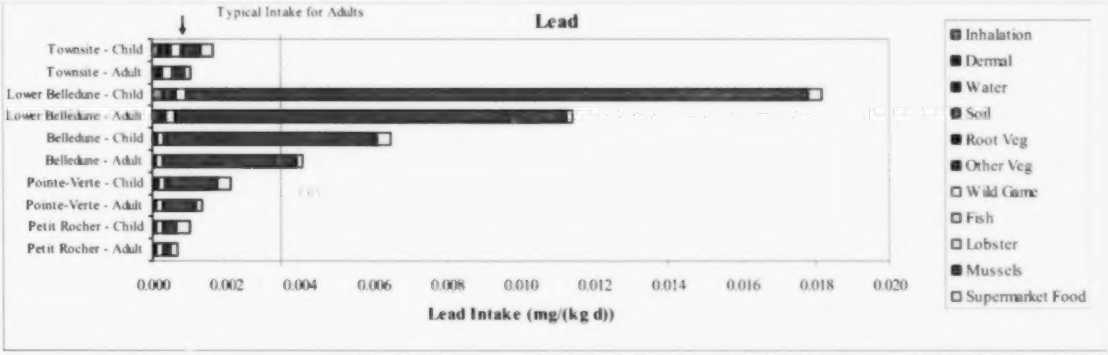


FIGURE F4.14
PREDICTED INTAKES OF LEAD (UPPER BOUND) – ASSESSMENT 3



F4.2.4 Assessment 4 - Lead Exposure

As seen from Figures F4.15 and F4.16, the addition of the fruit exposure pathway data does not change the results very much from the Assessment 1 scenario. This is because the fruit exposure pathway is relatively insignificant compared to the mussel exposure pathways.

FIGURE F4.15
PREDICTED INTAKES OF LEAD (BEST ESTIMATE) – ASSESSMENT 4

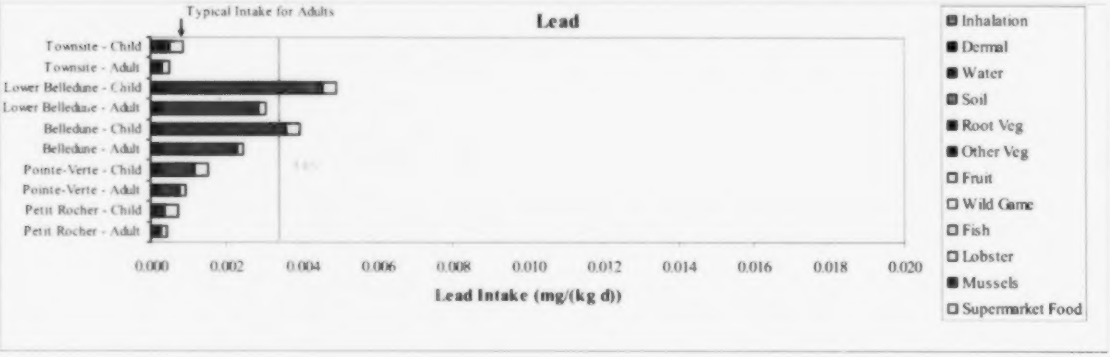
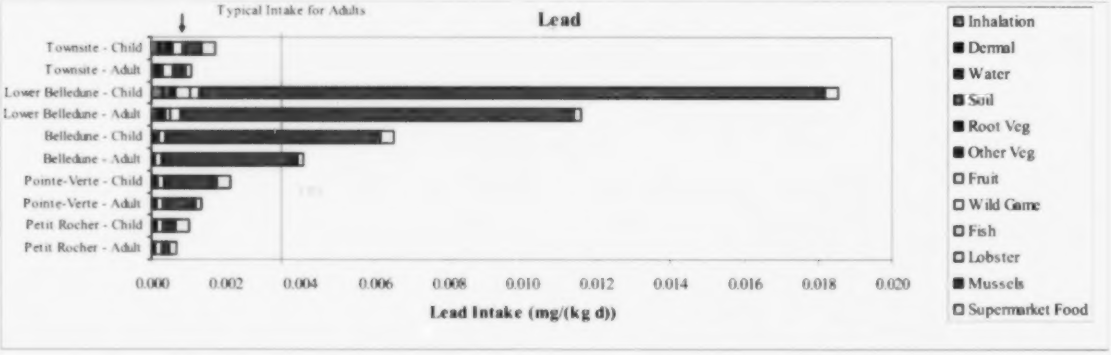


FIGURE F4.16
PREDICTED INTAKES OF LEAD (UPPER BOUND) – ASSESSMENT 4



F4.3 ASSESSMENT WITHOUT MUSSELS

Figures F4.17 and F4.18 provide the Best Estimate and Upper Bound Estimate exposures, respectively, for individuals that do not consume mussels from the Baie des Chaleurs using the Assessment 1 assumptions. As seen from this pathway, the removal of mussel exposure from the Baie des Chaleurs results in the exposures at the Best Estimate and Upper Bound that are below the cadmium TRV.

Similarly, the removal of the mussel pathway for lead exposures also results in intakes that are below the lead TRV for both the Best Estimate (Figure F4.19) and the Upper Bound (Figure F4.20).

FIGURE F4.17
PREDICTED INTAKES OF CADMIUM (BEST ESTIMATE) – NO MUSSELS

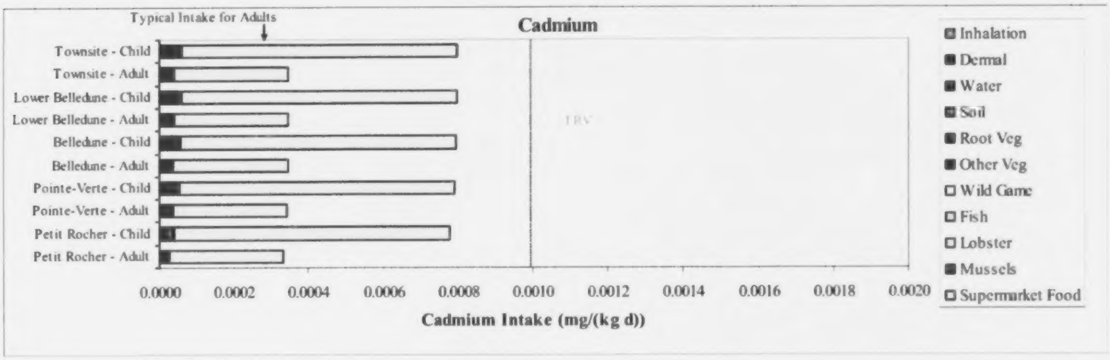


FIGURE F4.18
PREDICTED INTAKES OF CADMIUM (UPPER BOUND) – NO MUSSELS

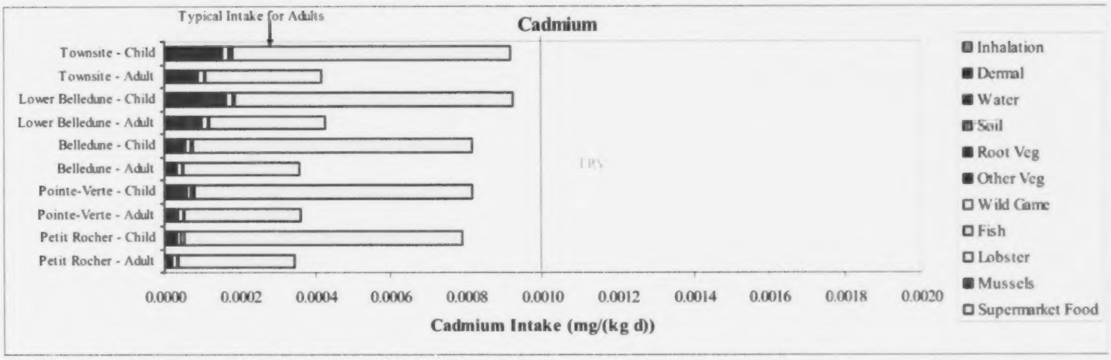


FIGURE F4.19
PREDICTED INTAKES OF LEAD (BEST ESTIMATE) – NO MUSSELS

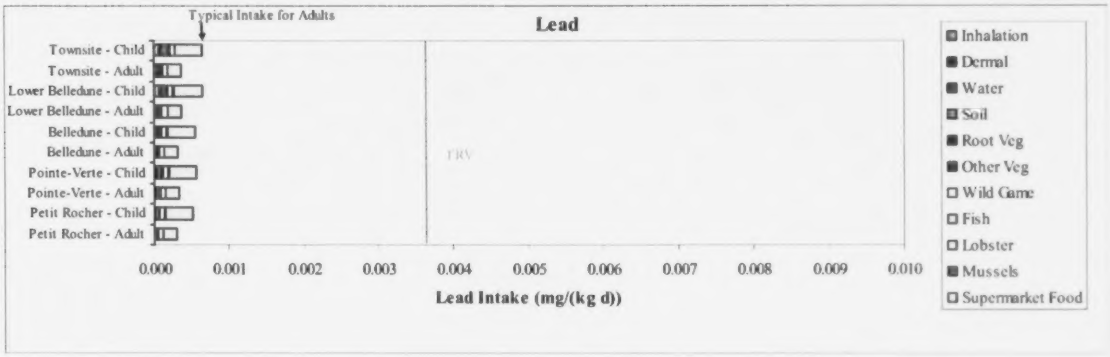
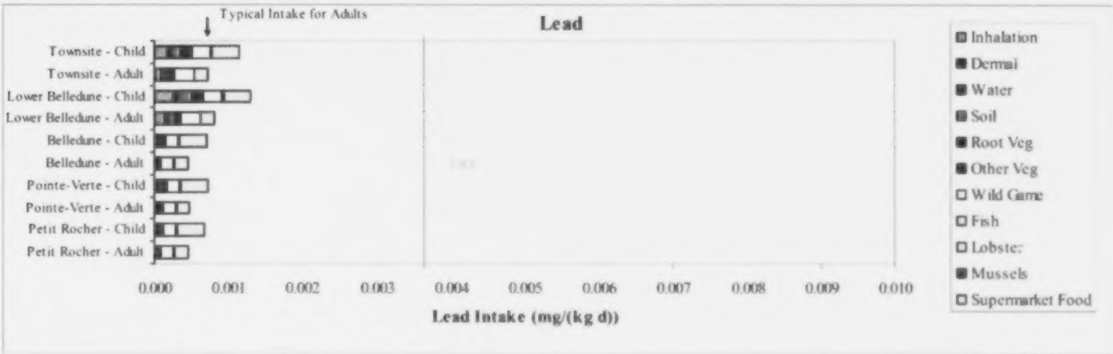


FIGURE F4.20
PREDICTED INTAKES OF LEAD (UPPER BOUND) – NO MUSSELS



F5.0 SUMMARY

In summary, the use of the 2005 measured data does not substantially change the results of the previous risk assessment. This current assessment has demonstrated the following:

- The backyard vegetable and fruit concentrations represent a very small portion of the exposure to individuals living in the Belledune area and thus any changes in EPC concentrations between the two risk assessments does not impact the overall results.
- A reduction in the uncertainty in the fish data has occurred, especially for lead, indicating that fish consumption is not a major exposure pathway.

Mussel consumption is still a major exposure pathway for both cadmium and lead. However, the revised mussel EPCs were still uncertain due to the small number of samples. The removal of this exposure pathway results in cadmium and lead exposures that are below their respective TRVs.

REFERENCES

Goss Gilroy 2005. *Belledune Area Health Study*. Prepared for the New Brunswick Department of Health and Wellness. February.

TABLE F4.3
SUMMARY TABLES FOR ASSESSMENT 1

Revised EPCs - Marine Fish

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Cadmium	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	7.83E-07	1.98E-06	1.71E-06	2.83E-06	8.00E-06	8.67E-06	5.25E-06	8.66E-06	6.58E-05	2.51E-04	1.86E-05	6.28E-05		
Townsite - Toddler	1.72E-06	4.35E-06	1.26E-06	2.08E-06	7.95E-06	8.61E-06	1.04E-05	1.72E-05	4.13E-05	1.58E-04	8.60E-06	2.90E-05	8.80E-06	2.06E-05
Townsite - Child	1.35E-06	3.40E-06	9.56E-07	1.58E-06	5.32E-06	5.76E-06	1.31E-06	2.16E-06	3.18E-05	1.21E-04	6.31E-06	2.13E-05	6.49E-06	1.52E-05
Townsite - Teen	8.09E-07	2.04E-06	7.68E-07	1.27E-06	3.66E-06	3.97E-06	7.22E-07	1.19E-06	2.47E-05	9.44E-05	4.26E-06	1.44E-05	5.01E-06	1.17E-05
Townsite - Adult	6.83E-07	1.72E-06	7.30E-07	1.20E-06	4.64E-06	5.03E-06	6.09E-07	1.00E-06	1.73E-05	6.60E-05	4.10E-06	1.39E-05	6.52E-06	1.53E-05
Lower Belledune - Infant	6.53E-07	2.86E-06	1.46E-06	4.04E-06	8.00E-06	8.67E-06	4.48E-06	1.24E-05	6.06E-05	1.63E-04	2.24E-05	2.05E-04		
Lower Belledune - Toddler	1.44E-06	6.29E-06	1.07E-06	2.97E-06	7.95E-06	8.61E-06	8.90E-06	2.46E-05	3.81E-05	1.02E-04	1.04E-05	9.49E-05	8.80E-06	2.06E-05
Lower Belledune - Child	1.12E-06	4.92E-06	8.15E-07	2.25E-06	5.32E-06	5.76E-06	1.12E-06	3.08E-06	2.93E-05	7.86E-05	7.61E-06	6.96E-05	6.49E-06	1.52E-05
Lower Belledune - Teen	6.75E-07	2.95E-06	6.54E-07	1.81E-06	3.66E-06	3.97E-06	6.15E-07	1.70E-06	2.28E-05	6.11E-05	5.14E-06	4.70E-05	5.01E-06	1.17E-05
Lower Belledune - Adult	5.70E-07	2.49E-06	6.22E-07	1.72E-06	4.64E-06	5.03E-06	5.19E-07	1.43E-06	1.59E-05	4.27E-05	4.95E-06	4.53E-05	6.52E-06	1.53E-05
Belledune - Infant	1.96E-07	3.92E-07	5.70E-07	7.48E-07	8.00E-06	8.67E-06	1.75E-06	2.29E-06	5.76E-05	7.24E-05	2.50E-05	4.23E-05		
Belledune - Toddler	4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.95E-06	8.61E-06	3.47E-06	4.56E-06	3.62E-05	4.55E-05	1.16E-05	1.96E-05	8.80E-06	1.49E-05
Belledune - Child	3.37E-07	6.74E-07	3.18E-07	4.17E-07	5.32E-06	5.76E-06	4.35E-07	5.71E-07	2.79E-05	3.50E-05	8.48E-06	1.44E-05	6.49E-06	1.10E-05
Belledune - Teen	2.02E-07	4.05E-07	2.55E-07	3.35E-07	3.66E-06	3.97E-06	2.40E-07	3.15E-07	2.17E-05	2.72E-05	5.72E-06	9.68E-06	5.01E-06	8.46E-06
Belledune - Adult	1.71E-07	3.42E-07	2.43E-07	3.19E-07	4.64E-06	5.03E-06	2.03E-07	2.66E-07	1.51E-05	1.90E-05	5.52E-06	9.34E-06	6.52E-06	1.10E-05
Pointe-Verte - Infant	1.64E-07	3.29E-07	5.08E-07	6.56E-07	8.28E-06	9.48E-06	1.56E-06	2.01E-06	2.51E-05	3.25E-05	6.22E-05	1.03E-04		
Pointe-Verte - Toddler	3.62E-07	7.23E-07	3.73E-07	4.82E-07	8.23E-06	9.43E-06	3.10E-06	3.99E-06	1.58E-05	2.04E-05	2.88E-05	4.74E-05	8.80E-06	1.49E-05
Pointe-Verte - Child	2.83E-07	5.65E-07	2.84E-07	3.66E-07	5.50E-06	6.30E-06	3.88E-07	5.00E-07	1.21E-05	1.57E-05	2.11E-05	3.48E-05	6.49E-06	1.10E-05
Pointe-Verte - Teen	1.70E-07	3.40E-07	2.28E-07	2.93E-07	3.79E-06	4.34E-06	2.14E-07	2.76E-07	9.44E-06	1.22E-05	1.42E-05	2.35E-05	5.01E-06	8.46E-06
Pointe-Verte - Adult	1.43E-07	2.87E-07	2.17E-07	2.79E-07	4.80E-06	5.50E-06	1.81E-07	2.33E-07	6.60E-06	8.54E-06	1.37E-05	2.26E-05	6.52E-06	1.10E-05
Petit Rocher - Infant	2.28E-08	4.56E-08	2.33E-07	3.81E-07	7.68E-06	1.17E-05	7.12E-07	1.17E-06	3.40E-05	4.14E-05	8.33E-06	1.41E-05		
Petit Rocher - Toddler	5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.64E-06	1.17E-05	1.42E-06	2.32E-06	2.14E-05	2.60E-05	3.85E-06	6.52E-06	8.80E-06	1.49E-05
Petit Rocher - Child	3.92E-08	7.84E-08	1.30E-07	2.13E-07	5.11E-06	7.81E-06	1.78E-07	2.91E-07	1.64E-05	2.00E-05	2.83E-06	4.78E-06	6.49E-06	1.10E-05
Petit Rocher - Teen	2.35E-08	4.71E-08	1.04E-07	1.71E-07	3.52E-06	5.38E-06	9.78E-08	1.60E-07	1.28E-05	1.55E-05	1.91E-06	3.23E-06	5.01E-06	8.46E-06
Petit Rocher - Adult	1.99E-08	3.98E-08	9.91E-08	1.62E-07	4.46E-06	6.81E-06	8.26E-08	1.35E-07	8.93E-06	1.09E-05	1.84E 06	3.11E-06	6.52E-06	1.10E-05

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Lead	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	4.08E-05	1.00E-04	4.54E-06	7.75E-06	4.75E-05	6.54E-05	3.24E-04	5.54E-04	3.69E-05	2.73E-04	1.60E-05	4.36E-05		
Townsite - Toddler	8.99E-05	2.20E-04	3.33E-06	5.69E-06	4.72E-05	6.50E-05	6.45E-04	1.10E-03	2.32E-05	1.72E-04	7.41E-06	2.02E-05	9.06E-05	3.53E-04
Townsite - Child	7.03E-05	1.72E-04	2.53E-06	4.32E-06	3.16E-05	4.35E-05	8.08E-05	1.38E-04	1.79E-05	1.32E-04	5.44E-06	1.48E-05	6.68E-05	2.60E-04
Townsite - Teen	4.22E-05	1.03E-04	2.03E-06	3.47E-06	2.17E-05	3.00E-05	4.45E-05	7.60E-05	1.39E-05	1.03E-04	3.67E-06	9.98E-06	5.15E-05	2.01E-04
Townsite - Adult	3.56E-05	8.73E-05	1.93E-06	3.30E-06	2.75E-05	3.80E-05	3.76E-05	6.42E-05	9.71E-06	7.18E-05	3.54E-06	9.62E-06	6.71E-05	2.62E-04
Lower Belledune - Infant	3.45E-05	1.48E-04	3.94E-06	1.13E-05	4.75E-05	6.54E-05	2.82E-04	8.05E-04	3.25E-05	1.70E-04	3.14E-05	2.05E-04		
Lower Belledune - Toddler	7.59E-05	3.26E-04	2.90E-06	8.28E-06	4.72E-05	6.50E-05	5.60E-04	1.60E-03	2.04E-05	1.07E-04	1.45E-05	9.49E-05	9.06E-05	3.53E-04
Lower Belledune - Child	5.94E-05	2.55E-04	2.20E-06	6.28E-06	3.16E-05	4.35E-05	7.02E-05	2.01E-04	1.57E-05	8.22E-05	1.07E-05	6.96E-05	6.68E-05	2.60E-04
Lower Belledune - Teen	3.57E-05	1.53E-04	1.76E-06	5.04E-06	2.17E-05	3.00E-05	3.87E-05	1.11E-04	1.22E-05	6.38E-05	7.19E-06	4.70E-05	5.15E-05	2.01E-04
Lower Belledune - Adult	3.01E-05	1.29E-04	1.68E-06	4.80E-06	2.75E-05	3.80E-05	3.27E-05	9.34E-05	8.54E-06	4.46E-05	6.93E-06	4.53E-05	6.71E-05	2.62E-04
Belledune - Infant	1.04E-05	2.08E-05	1.67E-06	2.29E-06	4.75E-05	6.54E-05	1.20E-04	1.63E-04	2.44E-05	3.62E-05	1.92E-05	3.08E-05		
Belledune - Toddler	2.29E-05	4.58E-05	1.23E-06	1.68E-06	4.72E-05	6.50E-05	2.38E-04	3.25E-04	1.53E-05	2.28E-05	8.89E-06	1.42E-05	9.06E-05	2.27E-04
Belledune - Child	1.79E-05	3.58E-05	9.34E-07	1.27E-06	3.16E-05	4.35E-05	2.98E-05	4.07E-05	1.18E-05	1.75E-05	6.52E-06	1.04E-05	6.68E-05	1.67E-04
Belledune - Teen	1.08E-05	2.15E-05	7.49E-07	1.02E-06	2.17E-05	3.00E-05	1.64E-05	2.24E-05	9.16E-06	1.36E-05	4.40E-06	7.04E-06	5.15E-05	1.29E-04
Belledune - Adult	9.08E-06	1.82E-05	7.13E-07	9.74E-07	2.75E-05	3.80E-05	1.39E-05	1.89E-05	6.41E-06	9.51E-06	4.24E-06	6.79E-06	6.71E-05	1.68E-04
Pointe-Verte - Infant	9.00E-06	1.80E-05	1.54E-06	2.05E-06	9.11E-05	1.28E-04	1.10E-04	1.47E-04	8.13E-06	1.18E-05	1.60E-05	2.44E-05		
Pointe-Verte - Toddler	1.98E-05	3.96E-05	1.13E-06	1.51E-06	9.05E-05	1.27E-04	2.19E-04	2.92E-04	5.11E-06	7.43E-06	7.41E-06	1.13E-05	9.06E-05	2.27E-04
Pointe-Verte - Child	1.55E-05	3.10E-05	8.60E-07	1.15E-06	6.05E-05	8.52E-05	2.75E-05	3.66E-05	3.93E-06	5.72E-06	5.44E-06	8.26E-06	6.68E-05	1.67E-04
Pointe-Verte - Teen	9.31E-06	1.86E-05	6.90E-07	9.19E-07	4.17E-05	5.87E-05	1.51E-05	2.02E-05	3.05E-06	4.44E-06	3.67E-06	5.58E-06	5.15E-05	1.29E-04
Pointe-Verte - Adult	7.86E-06	1.57E-05	6.57E-07	8.75E-07	5.28E-05	7.43E-05	1.28E-05	1.70E-05	2.14E-06	3.11E-06	3.54E-06	5.38E-06	6.71E-05	1.68E-04
Petit Rocher - Infant	1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.07E-05	1.17E-04	5.83E-05	9.49E-05	1.03E-05	1.40E-05	4.74E-06	7.69E-06		
Petit Rocher - Toddler	2.82E-06	5.63E-06	5.99E-07	9.75E-07	6.04E-05	1.16E-04	1.16E-04	1.89E-04	6.50E-06	8.83E-06	2.19E-06	3.56E-06	9.06E-05	2.27E-04
Petit Rocher - Child	2.20E-06	4.41E-06	4.55E-07	7.40E-07	4.04E-05	7.76E-05	1.45E-05	2.36E-05	5.00E-06	6.79E-06	1.61E-06	2.61E-06	6.68E-05	1.67E-04
Petit Rocher - Teen	1.32E-06	2.65E-06	3.65E-07	5.94E-07	2.78E-05	5.35E-05	8.00E-06	1.30E-05	3.89E-06	5.27E-06	1.09E-06	1.76E-06	5.15E-05	1.29E-04
Petit Rocher - Adult	1.12E-06	2.23E-06	3.47E-07	5.65E-07	3.52E-05	6.77E-05	6.76E-06	1.10E-05	2.72E-06	3.69E-06	1.05E-06	1.70E-06	6.71E-05	1.68E-04

Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)
Fish		Lobster		Mussels		
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food
9.15E-07	1.10E-06					6.12E-04
2.40E-06	2.88E-06	3.78E-07	4.55E-07			7.26E-04
6.24E-06	7.49E-06	8.76E-07	1.06E-06	1.14E-04	1.83E-04	7.38E-04
3.44E-06	4.13E-06	4.83E-07	5.82E-07	6.28E-05	1.01E-04	4.53E-04
3.93E-06	4.71E-06	5.51E-07	6.64E-07	7.16E-05	1.15E-04	3.07E-04
9.15E-07	1.10E-06					6.12E-04
2.40E-06	2.88E-06	4.21E-07	4.72E-07			7.26E-04
6.24E-06	7.49E-06	9.77E-07	1.09E-06	1.97E-04	4.22E-04	7.38E-04
3.44E-06	4.13E-06	5.39E-07	6.03E-07	1.08E-04	2.32E-04	4.53E-04
3.93E-06	4.71E-06	6.15E-07	6.88E-07	1.24E-04	2.65E-04	3.07E-04
9.15E-07	1.10E-06					6.12E-04
2.40E-06	2.88E-06	4.10E-07	4.50E-07			7.26E-04
6.24E-06	7.49E-06	9.52E-07	1.04E-06	1.83E-04	2.39E-04	7.38E-04
3.44E-06	4.13E-06	5.25E-07	5.75E-07	1.01E-04	1.32E-04	4.53E-04
3.93E-06	4.71E-06	5.99E-07	6.56E-07	1.15E-04	1.50E-04	3.07E-04
9.15E-07	1.10E-06					6.12E-04
2.40E-06	2.88E-06	3.27E-07	5.55E-07			7.26E-04
6.24E-06	7.49E-06	7.58E-07	1.29E-06	1.14E-04	1.34E-04	7.38E-04
3.44E-06	4.13E-06	4.18E-07	7.10E-07	6.28E-05	7.36E-05	4.53E-04
3.93E-06	4.71E-06	4.76E-07	8.10E-07	7.16E-05	8.40E-05	3.07E-04
9.15E-07	1.10E-06					6.12E-04
2.40E-06	2.88E-06	3.78E-07	6.09E-07			7.26E-04
6.24E-06	7.49E-06	8.76E-07	1.41E-06	8.15E-05	9.98E-05	7.38E-04
3.44E-06	4.13E-06	4.83E-07	7.79E-07	4.49E-05	5.50E-05	4.53E-04
3.93E-06	4.71E-06	5.51E-07	8.89E-07	5.13E-05	6.28E-05	3.07E-04

TRV 1.00E-03 1.00E-03

Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
7.83E-07	1.98E-06	1.71E-06	2.83E-06	7.11E-04	9.44E-04	7.13E-04	9.49E-04
1.72E-06	4.35E-06	1.26E-06	2.08E-06	8.06E-04	9.63E-04	8.09E-04	9.69E-04
1.35E-06	3.40E-06	9.56E-07	1.58E-06	9.10E-04	1.10E-03	9.13E-04	1.10E-03
8.09E-07	2.04E-06	7.68E-07	1.27E-06	5.58E-04	6.84E-04	5.60E-04	6.87E-04
6.83E-07	1.72E-06	7.30E-07	1.20E-06	4.16E-04	5.28E-04	4.18E-04	5.31E-04
6.53E-07	2.86E-06	1.46E-06	4.04E-06	7.08E-04	1.00E-03	7.11E-04	1.01E-03
1.44E-06	6.29E-06	1.07E-06	2.97E-06	8.03E-04	9.80E-04	8.05E-04	9.89E-04
1.12E-06	4.92E-06	8.15E-07	2.25E-06	9.92E-04	1.34E-03	9.94E-04	1.35E-03
6.75E-07	2.95E-06	6.54E-07	1.81E-06	6.03E-04	8.16E-04	6.04E-04	8.20E-04
5.70E-07	2.49E-06	6.22E-07	1.72E-06	4.68E-04	6.87E-04	4.69E-04	6.92E-04
1.96E-07	3.92E-07	5.70E-07	7.48E-07	7.05E-04	7.39E-04	7.06E-04	7.40E-04
4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.97E-04	8.22E-04	7.98E-04	8.24E-04
3.37E-07	6.74E-07	3.18E-07	4.17E-07	9.77E-04	1.05E-03	9.77E-04	1.05E-03
2.02E-07	4.05E-07	2.55E-07	3.35E-07	5.94E-04	6.39E-04	5.94E-04	6.40E-04
1.71E-07	3.42E-07	2.43E-07	3.19E-07	4.58E-04	5.07E-04	4.59E-04	5.08E-04
1.64E-07	3.29E-07	5.08E-07	6.56E-07	7.10E-04	7.60E-04	7.11E-04	7.61E-04
3.62E-07	7.23E-07	3.73E-07	4.82E-07	7.93E-04	8.26E-04	7.94E-04	8.27E-04
2.83E-07	5.65E-07	2.84E-07	3.66E-07	9.04E-04	9.49E-04	9.05E-04	9.50E-04
1.70E-07	3.40E-07	2.28E-07	2.93E-07	5.52E-04	5.80E-04	5.53E-04	5.81E-04
1.43E-07	2.87E-07	2.17E-07	2.79E-07	4.15E-04	4.44E-04	4.15E-04	4.45E-04
2.28E-08	4.56E-08	2.33E-07	3.81E-07	6.64E-04	6.81E-04	6.64E-04	6.82E-04
5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.72E-04	7.91E-04	7.72E-04	7.91E-04
3.92E-08	7.84E-08	1.30E-07	2.13E-07	8.58E-04	8.91E-04	8.58E-04	8.91E-04
2.35E-08	4.71E-08	1.04E-07	1.71E-07	5.25E-04	5.46E-04	5.25E-04	5.46E-04
1.99E-08	3.98E-08	9.91E-08	1.62E-07	3.85E-04	4.07E-04	3.85E-04	4.08E-04

Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)
Fish		Lobster		Mussels		
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food
5.79E-07	7.93E-07					4.69E-04
1.52E-06	2.08E-06	3.05E-06	6.21E-06			4.81E-04
3.95E-06	5.41E-06	7.09E-06	1.44E-05	1.83E-04	5.06E-04	3.68E-04
2.18E-06	2.98E-06	3.90E-06	7.94E-06	1.01E-04	2.79E-04	2.24E-04
2.49E-06	3.40E-06	4.46E-06	9.06E-06	1.15E-04	3.18E-04	1.83E-04
5.79E-07	7.93E-07					4.69E-04
1.52E-06	2.08E-06	5.42E-06	6.91E-06			4.81E-04
3.95E-06	5.41E-06	1.26E-05	1.60E-05	4.22E-03	1.69E-02	3.68E-04
2.18E-06	2.98E-06	6.92E-06	8.84E-06	2.32E-03	9.30E-03	2.24E-04
2.49E-06	3.40E-06	7.90E-06	1.01E-05	2.65E-03	1.06E-02	1.83E-04
5.79E-07	7.93E-07					4.69E-04
1.52E-06	2.08E-06	4.83E-06	6.13E-06			4.81E-04
3.95E-06	5.41E-06	1.12E-05	1.42E-05	3.37E-03	5.76E-03	3.68E-04
2.18E-06	2.98E-06	6.17E-06	7.83E-06	1.86E-03	3.18E-03	2.24E-04
2.49E-06	3.40E-06	7.04E-06	8.94E-06	2.12E-03	3.62E-03	1.83E-04
5.79E-07	7.93E-07					4.69E-04
1.52E-06	2.08E-06	3.35E-06	5.45E-06			4.81E-04
3.95E-06	5.41E-06	7.77E-06	1.26E-05	9.56E-04	1.39E-03	3.68E-04
2.18E-06	2.98E-06	4.28E-06	6.96E-06	5.27E-04	7.67E-04	2.24E-04
2.49E-06	3.40E-06	4.89E-06	7.95E-06	6.01E-04	8.75E-04	1.83E-04
5.79E-07	7.93E-07					4.69E-04
1.52E-06	2.08E-06	3.18E-06	6.02E-06			4.81E-04
3.95E-06	5.41E-06	7.38E-06	1.40E-05	2.25E-04	3.37E-04	3.68E-04
2.18E-06	2.98E-06	4.07E-06	7.69E-06	1.24E-04	1.86E-04	2.24E-04
2.49E-06	3.40E-06	4.64E-06	8.78E-06	1.41E-04	2.12E-04	1.83E-04

TRV 3.60E-03 3.60E-03

Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
4.08E-05	1.00E-04	4.54E-06	7.75E-06	8.94E-04	1.41E-03	9.40E-04	1.51E-03
8.99E-05	2.20E-04	3.33E-06	5.69E-06	1.30E-03	2.20E-03	1.39E-03	2.43E-03
7.03E-05	1.72E-04	2.53E-06	4.32E-06	7.64E-04	1.48E-03	8.37E-04	1.66E-03
4.22E-05	1.03E-04	2.03E-06	3.47E-06	4.66E-04	9.33E-04	5.10E-04	1.04E-03
3.56E-05	8.73E-05	1.93E-06	3.30E-06	4.50E-04	9.59E-04	4.88E-04	1.05E-03
3.45E-05	1.48E-04	3.94E-06	1.13E-05	8.63E-04	1.72E-03	9.01E-04	1.88E-03
7.59E-05	3.26E-04	2.90E-06	8.28E-06	1.22E-03	2.71E-03	1.30E-03	3.04E-03
5.94E-05	2.55E-04	2.20E-06	6.28E-06	4.80E-03	1.79E-02	4.86E-03	1.82E-02
3.57E-05	1.53E-04	1.76E-06	5.04E-06	2.69E-03	9.98E-03	2.73E-03	1.01E-02
3.01E-05	1.29E-04	1.68E-06	4.80E-06	2.99E-03	1.13E-02	3.02E-03	1.14E-02
1.04E-05	2.08E-05	1.67E-06	2.29E-06	6.80E-04	7.66E-04	6.92E-04	7.89E-04
2.29E-05	4.58E-05	1.23E-06	1.68E-06	8.87E-04	1.14E-03	9.11E-04	1.19E-03
1.79E-05	3.58E-05	9.34E-07	1.27E-06	3.90E-03	6.43E-03	3.92E-03	6.47E-03
1.08E-05	2.15E-05	7.49E-07	1.02E-06	2.19E-03	3.61E-03	2.21E-03	3.64E-03
9.08E-06	1.82E-05	7.13E-07	9.74E-07	2.43E-03	4.06E-03	2.44E-03	4.08E-03
9.00E-06	1.80E-05	1.54E-06	2.05E-06	6.95E-04	7.81E-04	7.06E-04	8.01E-04
1.98E-05	3.96E-05	1.13E-06	1.51E-06	8.99E-04	1.15E-03	9.20E-04	1.19E-03
1.55E-05	3.10E-05	8.60E-07	1.15E-06	1.50E-03	2.08E-03	1.52E-03	2.11E-03
9.31E-06	1.86E-05	6.90E-07	9.19E-07	8.72E-04	1.22E-03	8.82E-04	1.24E-03
7.86E-06	1.57E-05	6.57E-07	8.75E-07	9.30E-04	1.34E-03	9.38E-04	1.35E-03
1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.04E-04	7.03E-04	6.06E-04	7.07E-04
2.82E-06	5.63E-06	5.99E-07	9.75E-07	7.61E-04	1.03E-03	7.65E-04	1.04E-03
2.20E-06	4.41E-06	4.55E-07	7.40E-07	7.33E-04	1.00E-03	7.35E-04	1.01E-03
1.32E-06	2.65E-06	3.65E-07	5.94E-07	4.47E-04	6.23E-04	4.48E-04	6.26E-04
1.12E-06	2.23E-06	3.47E-07	5.65E-07	4.44E-04	6.59E-04	4.46E-04	6.62E-04

TABLE F4.4
SUMMARY TABLES FOR ASSESSMENT 2

Revised EPCs - Marine Fish

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Cadmium	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	7.83E-07	1.98E-06	1.71E-06	2.83E-06	8.00E-06	8.67E-06	5.25E-06	8.66E-06	6.58E-05	2.51E-04	1.86E-05	6.28E-05		
Townsite - Toddler	1.72E-06	4.35E-06	1.26E-06	2.08E-06	7.95E-06	8.61E-06	1.04E-05	1.72E-05	4.13E-05	1.58E-04	8.60E-06	2.90E-05	8.80E-06	2.06E-05
Townsite - Child	1.35E-06	3.40E-06	9.56E-07	1.58E-06	5.32E-06	5.76E-06	1.31E-06	2.16E-06	3.18E-05	1.21E-04	6.31E-06	2.13E-05	6.49E-06	1.52E-05
Townsite - Teen	8.09E-07	2.04E-06	7.68E-07	1.27E-06	3.66E-06	3.97E-06	7.22E-07	1.19E-06	2.47E-05	9.44E-05	4.26E-06	1.44E-05	5.01E-06	1.17E-05
Townsite - Adult	6.83E-07	1.72E-06	7.30E-07	1.20E-06	4.64E-06	5.03E-06	6.09E-07	1.00E-06	1.73E-05	6.60E-05	4.10E-06	1.39E-05	6.52E-06	1.53E-05
Lower Belledune - Infant	6.53E-07	2.86E-06	1.46E-06	4.04E-06	8.00E-06	8.67E-06	4.48E-06	1.24E-05	6.06E-05	1.63E-04	2.24E-05	2.05E-04		
Lower Belledune - Toddler	1.44E-06	6.29E-06	1.07E-06	2.97E-06	7.95E-06	8.61E-06	8.90E-06	2.46E-05	3.81E-05	1.02E-04	1.04E-05	9.49E-05	8.80E-06	2.06E-05
Lower Belledune - Child	1.12E-06	4.92E-06	8.15E-07	2.25E-06	5.32E-06	5.76E-06	1.12E-06	3.08E-06	2.93E-05	7.86E-05	7.61E-06	6.96E-05	6.49E-06	1.52E-05
Lower Belledune - Teen	6.75E-07	2.95E-06	6.54E-07	1.81E-06	3.66E-06	3.97E-06	6.15E-07	1.70E-06	2.28E-05	6.11E-05	5.14E-06	4.70E-05	5.01E-06	1.17E-05
Lower Belledune - Adult	5.70E-07	2.49E-06	6.22E-07	1.72E-06	4.64E-06	5.03E-06	5.19E-07	1.43E-06	1.59E-05	4.27E-05	4.95E-06	4.53E-05	6.52E-06	1.53E-05
Belledune - Infant	1.96E-07	3.92E-07	5.70E-07	7.48E-07	8.00E-06	8.67E-06	1.75E-06	2.29E-06	5.76E-05	7.24E-05	2.50E-05	4.23E-05		
Belledune - Toddler	4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.95E-06	8.61E-06	3.47E-06	4.56E-06	3.62E-05	4.55E-05	1.16E-05	1.96E-05	8.80E-06	1.49E-05
Belledune - Child	3.37E-07	6.74E-07	3.18E-07	4.17E-07	5.32E-06	5.76E-06	4.35E-07	5.71E-07	2.79E-05	3.50E-05	8.48E-06	1.44E-05	6.49E-06	1.10E-05
Belledune - Teen	2.02E-07	4.05E-07	2.55E-07	3.35E-07	3.66E-06	3.97E-06	2.40E-07	3.15E-07	2.17E-05	2.72E-05	5.72E-06	9.68E-06	5.01E-06	8.46E-06
Belledune - Adult	1.71E-07	3.42E-07	2.43E-07	3.19E-07	4.64E-06	5.03E-06	2.03E-07	2.66E-07	1.51E-05	1.90E-05	5.52E-06	9.34E-06	6.52E-06	1.10E-05
Pointe-Verte - Infant	1.64E-07	3.29E-07	5.08E-07	6.56E-07	8.28E-06	9.48E-06	1.56E-06	2.01E-06	2.51E-05	3.25E-05	6.22E-05	1.03E-04		
Pointe-Verte - Toddler	3.62E-07	7.23E-07	3.73E-07	4.82E-07	8.23E-06	9.43E-06	3.10E-06	3.99E-06	1.58E-05	2.04E-05	2.88E-05	4.74E-05	8.80E-06	1.49E-05
Pointe-Verte - Child	2.83E-07	5.65E-07	2.84E-07	3.66E-07	5.50E-06	6.30E-06	3.88E-07	5.00E-07	1.21E-05	1.57E-05	2.11E-05	3.48E-05	6.49E-06	1.10E-05
Pointe-Verte - Teen	1.70E-07	3.40E-07	2.28E-07	2.93E-07	3.79E-06	4.34E-06	2.14E-07	2.76E-07	9.44E-06	1.22E-05	1.42E-05	2.35E-05	5.01E-06	8.46E-06
Pointe-Verte - Adult	1.43E-07	2.87E-07	2.17E-07	2.79E-07	4.80E-06	5.50E-06	1.81E-07	2.33E-07	6.60E-06	8.54E-06	1.37E-05	2.26E-05	6.52E-06	1.10E-05
Petit Rocher - Infant	2.28E-08	4.56E-08	2.33E-07	3.81E-07	7.68E-06	1.17E-05	7.12E-07	1.17E-06	3.40E-05	4.14E-05	8.33E-06	1.41E-05		
Petit Rocher - Toddler	5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.64E-06	1.17E-05	1.42E-06	2.32E-06	2.14E-05	2.60E-05	3.85E-06	6.52E-06	8.80E-06	1.49E-05
Petit Rocher - Child	3.92E-08	7.84E-08	1.30E-07	2.13E-07	5.11E-06	7.81E-06	1.78E-07	2.91E-07	1.64E-05	2.00E-05	2.83E-06	4.78E-06	6.49E-06	1.10E-05
Petit Rocher - Teen	2.35E-08	4.71E-08	1.04E-07	1.71E-07	3.52E-06	5.38E-06	9.78E-08	1.60E-07	1.28E-05	1.55E-05	1.91E-06	3.23E-06	5.01E-06	8.46E-06
Petit Rocher - Adult	1.99E-08	3.98E-08	9.91E-08	1.62E-07	4.46E-06	6.81E-06	8.26E-08	1.35E-07	8.93E-06	1.09E-05	1.84E-06	3.11E-06	6.52E-06	1.10E-05

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Lead	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	4.08E-05	1.00E-04	4.54E-06	7.75E-06	4.75E-05	6.54E-05	3.24E-04	5.54E-04	3.69E-05	2.73E-04	1.60E-05	4.36E-05		
Townsite - Toddler	8.99E-05	2.20E-04	3.33E-06	5.69E-06	4.72E-05	6.50E-05	6.45E-04	1.10E-03	2.32E-05	1.72E-04	7.41E-06	2.02E-05	9.06E-05	3.53E-04
Townsite - Child	7.03E-05	1.72E-04	2.53E-06	4.32E-06	3.16E-05	4.35E-05	8.08E-05	1.38E-04	1.79E-05	1.32E-04	5.44E-06	1.48E-05	6.68E-05	2.60E-04
Townsite - Teen	4.22E-05	1.03E-04	2.03E-06	3.47E-06	2.17E-05	3.00E-05	4.45E-05	7.60E-05	1.39E-05	1.03E-04	3.67E-06	9.98E-06	5.15E-05	2.01E-04
Townsite - Adult	3.56E-05	8.73E-05	1.93E-06	3.30E-06	2.75E-05	3.80E-05	3.76E-05	6.42E-05	9.71E-06	7.18E-05	3.54E-06	9.62E-06	6.71E-05	2.62E-04
Lower Belledune - Infant	3.45E-05	1.48E-04	3.94E-06	1.13E-05	4.75E-05	6.54E-05	2.82E-04	8.05E-04	3.25E-05	1.70E-04	3.14E-05	2.05E-04		
Lower Belledune - Toddler	7.59E-05	3.26E-04	2.90E-06	8.28E-06	4.72E-05	6.50E-05	5.60E-04	1.60E-03	2.04E-05	1.07E-04	1.45E-05	9.49E-05	9.06E-05	3.53E-04
Lower Belledune - Child	5.94E-05	2.55E-04	2.20E-06	6.28E-06	3.16E-05	4.35E-05	7.02E-05	2.01E-04	1.57E-05	8.22E-05	1.07E-05	6.96E-05	6.68E-05	2.60E-04
Lower Belledune - Teen	3.57E-05	1.53E-04	1.76E-06	5.04E-06	2.17E-05	3.00E-05	3.87E-05	1.11E-04	1.22E-05	6.38E-05	7.19E-06	4.70E-05	5.15E-05	2.01E-04
Lower Belledune - Adult	3.01E-05	1.29E-04	1.68E-06	4.80E-06	2.75E-05	3.80E-05	3.27E-05	9.34E-05	8.54E-06	4.46E-05	6.93E-06	4.53E-05	6.71E-05	2.62E-04
Belledune - Infant	1.04E-05	2.08E-05	1.67E-06	2.29E-06	4.75E-05	6.54E-05	1.20E-04	1.63E-04	2.44E-05	3.62E-05	1.92E-05	3.08E-05		
Belledune - Toddler	2.29E-05	4.58E-05	1.23E-06	1.68E-06	4.72E-05	6.50E-05	2.38E-04	3.25E-04	1.53E-05	2.28E-05	8.89E-06	1.42E-05	9.06E-05	2.27E-04
Belledune - Child	1.79E-05	3.58E-05	9.34E-07	1.27E-06	3.16E-05	4.35E-05	2.98E-05	4.07E-05	1.18E-05	1.75E-05	6.52E-06	1.04E-05	6.68E-05	1.67E-04
Belledune - Teen	1.08E-05	2.15E-05	7.49E-07	1.02E-06	2.17E-05	3.00E-05	1.64E-05	2.24E-05	9.16E-06	1.36E-05	4.40E-06	7.04E-06	5.15E-05	1.29E-04
Belledune - Adult	9.08E-06	1.82E-05	7.13E-07	9.74E-07	2.75E-05	3.80E-05	1.39E-05	1.89E-05	6.41E-06	9.51E-06	4.24E-06	6.79E-06	6.71E-05	1.68E-04
Pointe-Verte - Infant	9.00E-06	1.80E-05	1.54E-06	2.05E-06	9.11E-05	1.28E-04	1.10E-04	1.47E-04	8.13E-06	1.18E-05	1.60E-05	2.44E-05		
Pointe-Verte - Toddler	1.98E-05	3.96E-05	1.13E-06	1.51E-06	9.05E-05	1.27E-04	2.19E-04	2.92E-04	5.11E-06	7.43E-06	7.41E-06	1.13E-05	9.06E-05	2.27E-04
Pointe-Verte - Child	1.55E-05	3.10E-05	8.60E-07	1.15E-06	6.05E-05	8.52E-05	2.75E-05	3.66E-05	3.93E-06	5.72E-06	5.44E-06	8.26E-06	6.68E-05	1.67E-04
Pointe-Verte - Teen	9.31E-06	1.86E-05	6.90E-07	9.19E-07	4.17E-05	5.87E-05	1.51E-05	2.02E-05	3.05E-06	4.44E-06	3.67E-06	5.58E-06	5.15E-05	1.29E-04
Pointe-Verte - Adult	7.86E-06	1.57E-05	6.57E-07	8.75E-07	5.28E-05	7.43E-05	1.28E-05	1.70E-05	2.14E-06	3.11E-06	3.54E-06	5.38E-06	6.71E-05	1.68E-04
Petit Rocher - Infant	1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.07E-05	1.17E-04	5.83E-05	9.49E-05	1.03E-05	1.40E-05	4.74E-06	7.69E-06		
Petit Rocher - Toddler	2.82E-06	5.63E-06	5.99E-07	9.75E-07	6.04E-05	1.16E-04	1.16E-04	1.89E-04	6.50E-06	8.83E-06	2.19E-06	3.56E-06	9.06E-05	2.27E-04
Petit Rocher - Child	2.20E-06	4.41E-06	4.55E-07	7.40E-07	4.04E-05	7.76E-05	1.45E-05	2.36E-05	5.00E-06	6.79E-06	1.61E-06	2.61E-06	6.68E-05	1.67E-04
Petit Rocher - Teen	1.32E-06	2.65E-06	3.65E-07	5.94E-07	2.78E-05	5.35E-05	8.00E-06	1.30E-05	3.89E-06	5.27E-06	1.09E-06	1.76E-06	5.15E-05	1.29E-04
Petit Rocher - Adult	1.12E-06	2.23E-06	3.47E-07	5.65E-07	3.52E-05	6.77E-05	6.76E-06	1.10E-05	2.72E-06	3.69E-06	1.05E-06	1.70E-06	6.71E-05	1.68E-04

Revised EPCs - Marine Fish

								TRV		1.00E-03		1.00E-03			
Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
	Fish		Lobster		Mussels										
Cadmium	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	9.15E-07	1.10E-06					6.12E-04	7.83E-07	1.98E-06	1.71E-06	2.83E-06	7.11E-04	9.44E-04	7.13E-04	9.49E-04
Townsite - Toddler	2.40E-06	2.88E-06	3.78E-07	4.55E-07			7.26E-04	1.72E-06	4.35E-06	1.26E-06	2.08E-06	8.06E-04	9.63E-04	8.09E-04	9.69E-04
Townsite - Child	6.24E-06	7.49E-06	8.76E-07	1.06E-06	1.14E-04	1.84E-04	7.38E-04	1.35E-06	3.40E-06	9.56E-07	1.58E-06	9.10E-04	1.10E-03	9.12E-04	1.10E-03
Townsite - Teen	3.44E-06	4.13E-06	4.83E-07	5.82E-07	6.27E-05	1.02E-04	4.53E-04	8.09E-07	2.04E-06	7.68E-07	1.27E-06	5.58E-04	6.85E-04	5.60E-04	6.88E-04
Townsite - Adult	3.93E-06	4.71E-06	5.51E-07	6.64E-07	7.16E-05	1.16E-04	3.07E-04	6.83E-07	1.72E-06	7.30E-07	1.20E-06	4.16E-04	5.29E-04	4.18E-04	5.32E-04
Lower Belledune - Infant	9.15E-07	1.10E-06					6.12E-04	6.53E-07	2.86E-06	1.46E-06	4.04E-06	7.08E-04	1.00E-03	7.11E-04	1.01E-03
Lower Belledune - Toddler	2.40E-06	2.88E-06	4.21E-07	4.72E-07			7.26E-04	1.44E-06	6.29E-06	1.07E-06	2.97E-06	8.03E-04	9.80E-04	8.05E-04	9.89E-04
Lower Belledune - Child	6.24E-06	7.49E-06	9.77E-07	1.09E-06	3.00E-04	4.64E-04	7.38E-04	1.12E-06	4.92E-06	8.15E-07	2.25E-06	1.09E-03	1.38E-03	1.10E-03	1.39E-03
Lower Belledune - Teen	3.44E-06	4.13E-06	5.39E-07	6.03E-07	1.65E-04	2.56E-04	4.53E-04	6.75E-07	2.95E-06	6.54E-07	1.81E-06	6.59E-04	8.39E-04	6.61E-04	8.44E-04
Lower Belledune - Adult	3.93E-06	4.71E-06	6.15E-07	6.88E-07	1.89E-04	2.92E-04	3.07E-04	5.70E-07	2.49E-06	6.22E-07	1.72E-06	5.33E-04	7.14E-04	5.34E-04	7.18E-04
Belledune - Infant	9.15E-07	1.10E-06					6.12E-04	1.96E-07	3.92E-07	5.70E-07	7.48E-07	7.05E-04	7.39E-04	7.06E-04	7.40E-04
Belledune - Toddler	2.40E-06	2.88E-06	4.10E-07	4.50E-07			7.26E-04	4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.97E-04	8.22E-04	7.98E-04	8.24E-04
Belledune - Child	6.24E-06	7.49E-06	9.52E-07	1.04E-06	1.41E-04	1.77E-04	7.38E-04	3.37E-07	6.74E-07	3.18E-07	4.17E-07	9.34E-04	9.90E-04	9.35E-04	9.91E-04
Belledune - Teen	3.44E-06	4.13E-06	5.25E-07	5.75E-07	7.75E-05	9.76E-05	4.53E-04	2.02E-07	4.05E-07	2.55E-07	3.35E-07	5.71E-04	6.05E-04	5.71E-04	6.06E-04
Belledune - Adult	3.93E-06	4.71E-06	5.99E-07	6.56E-07	8.85E-05	1.11E-04	3.07E-04	1.71E-07	3.42E-07	2.43E-07	3.19E-07	4.32E-04	4.68E-04	4.32E-04	4.69E-04
Pointe-Verte - Infant	9.15E-07	1.10E-06					6.12E-04	1.64E-07	3.29E-07	5.08E-07	6.56E-07	7.10E-04	7.60E-04	7.11E-04	7.61E-04
Pointe-Verte - Toddler	2.40E-06	2.88E-06	3.27E-07	5.55E-07			7.26E-04	3.62E-07	7.23E-07	3.73E-07	4.82E-07	7.93E-04	8.26E-04	7.94E-04	8.27E-04
Pointe-Verte - Child	6.24E-06	7.49E-06	7.58E-07	1.29E-06	1.42E-04	1.73E-04	7.38E-04	2.83E-07	5.65E-07	2.84E-07	3.66E-07	9.33E-04	9.88E-04	9.34E-04	9.89E-04
Pointe-Verte - Teen	3.44E-06	4.13E-06	4.18E-07	7.10E-07	7.84E-05	9.52E-05	4.53E-04	1.70E-07	3.40E-07	2.28E-07	2.93E-07	5.68E-04	6.02E-04	5.68E-04	6.02E-04
Pointe-Verte - Adult	3.93E-06	4.71E-06	4.76E-07	8.10E-07	8.95E-05	1.09E-04	3.07E-04	1.43E-07	2.87E-07	2.17E-07	2.79E-07	4.33E-04	4.69E-04	4.33E-04	4.70E-04
Petit Rocher - Infant	9.15E-07	1.10E-06					6.12E-04	2.28E-08	4.56E-08	2.33E-07	3.81E-07	6.64E-04	6.81E-04	6.64E-04	6.82E-04
Petit Rocher - Toddler	2.40E-06	2.88E-06	3.78E-07	6.09E-07			7.26E-04	5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.72E-04	7.91E-04	7.72E-04	7.91E-04
Petit Rocher - Child	6.24E-06	7.49E-06	8.76E-07	1.41E-06	1.11E-04	1.44E-04	7.38E-04	3.92E-08	7.84E-08	1.30E-07	2.13E-07	8.87E-04	9.35E-04	8.88E-04	9.35E-04
Petit Rocher - Teen	3.44E-06	4.13E-06	4.83E-07	7.79E-07	6.13E-05	7.95E-05	4.53E-04	2.35E-08	4.71E-08	1.04E-07	1.71E-07	5.41E-04	5.70E-04	5.42E-04	5.70E-04
Petit Rocher - Adult	3.93E-06	4.71E-06	5.51E-07	8.89E-07	6.99E-05	9.08E-05	3.07E-04	1.99E-08	3.98E-08	9.91E-08	1.62E-07	4.03E-04	4.35E-04	4.03E-04	4.36E-04

								TRV		3.60E-03		3.60E-03			
Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
	Fish		Lobster		Mussels										
Lead	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	5.79E-07	7.93E-07					4.69E-04	4.08E-05	1.00E-04	4.54E-06	7.75E-06	8.94E-04	1.41E-03	9.40E-04	1.51E-03
Townsite - Toddler	1.52E-06	2.08E-06	3.05E-06	6.21E-06			4.81E-04	8.99E-05	2.20E-04	3.33E-06	5.69E-06	1.30E-03	2.20E-03	1.39E-03	2.43E-03
Townsite - Child	3.95E-06	5.41E-06	7.09E-06	1.44E-05	1.77E-04	5.03E-04	3.68E-04	7.03E-05	1.72E-04	2.53E-06	4.32E-06	7.58E-04	1.48E-03	8.31E-04	1.66E-03
Townsite - Teen	2.18E-06	2.98E-06	3.90E-06	7.94E-06	9.74E-05	2.77E-04	2.24E-04	4.22E-05	1.03E-04	2.03E-06	3.47E-06	4.63E-04	9.31E-04	5.07E-04	1.04E-03
Townsite - Adult	2.49E-06	3.40E-06	4.46E-06	9.06E-06	1.11E-04	3.16E-04	1.83E-04	3.56E-05	8.73E-05	1.93E-06	3.30E-06	4.47E-04	9.57E-04	4.84E-04	1.05E-03
Lower Belledune - Infant	5.79E-07	7.93E-07					4.69E-04	3.45E-05	1.48E-04	3.94E-06	1.13E-05	8.63E-04	1.72E-03	9.01E-04	1.88E-03
Lower Belledune - Toddler	1.52E-06	2.08E-06	5.42E-06	6.91E-06			4.81E-04	7.59E-05	3.26E-04	2.90E-06	8.28E-06	1.22E-03	2.71E-03	1.30E-03	3.04E-03
Lower Belledune - Child	3.95E-06	5.41E-06	1.26E-05	1.60E-05	2.85E-03	4.04E-03	3.68E-04	5.94E-05	2.55E-04	2.20E-06	6.28E-06	3.43E-03	5.08E-03	3.49E-03	5.34E-03
Lower Belledune - Teen	2.18E-06	2.98E-06	6.92E-06	8.84E-06	1.57E-03	2.22E-03	2.24E-04	3.57E-05	1.53E-04	1.76E-06	5.04E-06	1.93E-03	2.91E-03	1.97E-03	3.07E-03
Lower Belledune - Adult	2.49E-06	3.40E-06	7.90E-06	1.01E-05	1.79E-03	2.54E-03	1.83E-04	3.01E-05	1.29E-04	1.68E-06	4.80E-06	2.13E-03	3.22E-03	2.16E-03	3.35E-03
Belledune - Infant	5.79E-07	7.93E-07					4.69E-04	1.04E-05	2.08E-05	1.67E-06	2.29E-06	6.80E-04	7.66E-04	6.92E-04	7.89E-04
Belledune - Toddler	1.52E-06	2.08E-06	4.83E-06	6.13E-06			4.81E-04	2.29E-05	4.58E-05	1.23E-06	1.68E-06	8.87E-04	1.14E-03	9.11E-04	1.19E-03
Belledune - Child	3.95E-06	5.41E-06	1.12E-05	1.42E-05	5.94E-04	9.36E-04	3.68E-04	1.79E-05	3.58E-05	9.34E-07	1.27E-06	1.12E-03	1.60E-03	1.14E-03	1.64E-03
Belledune - Teen	2.18E-06	2.98E-06	6.17E-06	7.83E-06	3.27E-04	5.16E-04	2.24E-04	1.08E-05	2.15E-05	7.49E-07	1.02E-06	6.63E-04	9.53E-04	6.75E-04	9.75E-04
Belledune - Adult	2.49E-06	3.40E-06	7.04E-06	8.94E-06	3.74E-04	5.88E-04	1.83E-04	9.08E-06	1.82E-05	7.13E-07	9.74E-07	6.85E-04	1.03E-03	6.95E-04	1.04E-03
Pointe-Verte - Infant	5.79E-07	7.93E-07					4.69E-04	9.00E-06	1.80E-05	1.54E-06	2.05E-06	6.95E-04	7.81E-04	7.06E-04	8.01E-04
Pointe-Verte - Toddler	1.52E-06	2.08E-06	3.35E-06	5.45E-06			4.81E-04	1.98E-05	3.96E-05	1.13E-06	1.51E-06	8.99E-04	1.15E-03	9.20E-04	1.19E-03
Pointe-Verte - Child	3.95E-06	5.41E-06	7.77E-06	1.26E-05	1.13E-03	1.45E-03	3.68E-04	1.55E-05	3.10E-05	8.60E-07	1.15E-06	1.67E-03	2.14E-03	1.69E-03	2.17E-03
Pointe-Verte - Teen	2.18E-06	2.98E-06	4.28E-06	6.96E-06	6.21E-04	8.00E-04	2.24E-04	9.31E-06	1.86E-05	6.90E-07	9.19E-07	9.67E-04	1.25E-03	9.77E-04	1.27E-03
Pointe-Verte - Adult	2.49E-06	3.40E-06	4.89E-06	7.95E-06	7.09E-04	9.12E-04	1.83E-04	7.86E-06	1.57E-05	6.57E-07	8.75E-07	1.04E-03	1.37E-03	1.05E-03	1.39E-03
Petit Rocher - Infant	5.79E-07	7.93E-07					4.69E-04	1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.04E-04	7.03E-04	6.06E-04	7.07E-04
Petit Rocher - Toddler	1.52E-06	2.08E-06	3.18E-06	6.02E-06			4.81E-04	2.82E-06	5.63E-06	5.99E-07	9.75E-07	7.61E-04	1.03E-03	7.65E-04	1.04E-03
Petit Rocher - Child	3.95E-06	5.41E-06	7.38E-06	1.40E-05	2.62E-04	5.49E-04	3.68E-04	2.20E-06	4.41E-06	4.55E-07	7.40E-07	7.70E-04	1.21E-03	7.73E-04	1.22E-03
Petit Rocher - Teen	2.18E-06	2.98E-06	4.07E-06	7.69E-06	1.45E-04	3.03E-04	2.24E-04	1.32E-06	2.65E-06	3.65E-07	5.94E-07	4.67E-04	7.40E-04	4.69E-04	7.43E-04
Petit Rocher - Adult	2.49E-06	3.40E-06	4.64E-06	8.78E-06	1.65E-04	3.45E-04	1.83E-04	1.12E-06	2.23E-06	3.47E-07	5.65E-07	4.68E-04	7.93E-04	4.69E-04	7.95E-04

TABLE F4.5
SUMMARY TABLES FOR ASSESSMENT 3

Revised EPCs - Marine Fish and
Freshwater Fish

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Cadmium	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	7.83E-07	1.98E-06	1.71E-06	2.83E-06	8.00E-06	8.67E-06	5.25E-06	8.66E-06	6.58E-05	2.51E-04	1.86E-05	6.28E-05		
Townsite - Toddler	1.72E-06	4.35E-06	1.26E-06	2.08E-06	7.95E-06	8.61E-06	1.04E-05	1.72E-05	4.13E-05	1.58E-04	8.60E-06	2.90E-05	8.80E-06	2.06E-05
Townsite - Child	1.35E-06	3.40E-06	9.56E-07	1.58E-06	5.32E-06	5.76E-06	1.31E-06	2.16E-06	3.18E-05	1.21E-04	6.31E-06	2.13E-05	6.49E-06	1.52E-05
Townsite - Teen	8.09E-07	2.04E-06	7.68E-07	1.27E-06	3.66E-06	3.97E-06	7.22E-07	1.19E-06	2.47E-05	9.44E-05	4.26E-06	1.44E-05	5.01E-06	1.17E-05
Townsite - Adult	6.83E-07	1.72E-06	7.30E-07	1.20E-06	4.64E-06	5.03E-06	6.09E-07	1.00E-06	1.73E-05	6.60E-05	4.10E-06	1.39E-05	6.52E-06	1.53E-05
Lower Belledune - Infant	6.53E-07	2.86E-06	1.46E-06	4.04E-06	8.00E-06	8.67E-06	4.48E-06	1.24E-05	6.06E-05	1.63E-04	2.24E-05	2.05E-04		
Lower Belledune - Toddler	1.44E-06	6.29E-06	1.07E-06	2.97E-06	7.95E-06	8.61E-06	8.90E-06	2.46E-05	3.81E-05	1.02E-04	1.04E-05	9.49E-05	8.80E-06	2.06E-05
Lower Belledune - Child	1.12E-06	4.92E-06	8.15E-07	2.25E-06	5.32E-06	5.76E-06	1.12E-06	3.08E-06	2.93E-05	7.86E-05	7.61E-06	6.96E-05	6.49E-06	1.52E-05
Lower Belledune - Teen	6.75E-07	2.95E-06	6.54E-07	1.81E-06	3.66E-06	3.97E-06	6.15E-07	1.70E-06	2.28E-05	6.11E-05	5.14E-06	4.70E-05	5.01E-06	1.17E-05
Lower Belledune - Adult	5.70E-07	2.49E-06	6.22E-07	1.72E-06	4.64E-06	5.03E-06	5.19E-07	1.43E-06	1.59E-05	4.27E-05	4.95E-06	4.53E-05	6.52E-06	1.53E-05
Belledune - Infant	1.96E-07	3.92E-07	5.70E-07	7.48E-07	8.00E-06	8.67E-06	1.75E-06	2.29E-06	5.76E-05	7.24E-05	2.50E-05	4.23E-05		
Belledune - Toddler	4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.95E-06	8.61E-06	3.47E-06	4.56E-06	3.62E-05	4.55E-05	1.16E-05	1.96E-05	8.80E-06	1.49E-05
Belledune - Child	3.37E-07	6.74E-07	3.18E-07	4.17E-07	5.32E-06	5.76E-06	4.35E-07	5.71E-07	2.79E-05	3.50E-05	8.48E-06	1.44E-05	6.49E-06	1.10E-05
Belledune - Teen	2.02E-07	4.05E-07	2.55E-07	3.35E-07	3.66E-06	3.97E-06	2.40E-07	3.15E-07	2.17E-05	2.72E-05	5.72E-06	9.68E-06	5.01E-06	8.46E-06
Belledune - Adult	1.71E-07	3.42E-07	2.43E-07	3.19E-07	4.64E-06	5.03E-06	2.03E-07	2.66E-07	1.51E-05	1.90E-05	5.52E-06	9.34E-06	6.52E-06	1.10E-05
Pointe-Verte - Infant	1.64E-07	3.29E-07	5.08E-07	6.56E-07	8.28E-06	9.48E-06	1.56E-06	2.01E-06	2.51E-05	3.25E-05	6.22E-05	1.03E-04		
Pointe-Verte - Toddler	3.62E-07	7.23E-07	3.73E-07	4.82E-07	8.23E-06	9.43E-06	3.10E-06	3.99E-06	1.58E-05	2.04E-05	2.88E-05	4.74E-05	8.80E-06	1.49E-05
Pointe-Verte - Child	2.83E-07	5.65E-07	2.84E-07	3.66E-07	5.50E-06	6.30E-06	3.88E-07	5.00E-07	1.21E-05	1.57E-05	2.11E-05	3.48E-05	6.49E-06	1.10E-05
Pointe-Verte - Teen	1.70E-07	3.40E-07	2.28E-07	2.93E-07	3.79E-06	4.34E-06	2.14E-07	2.76E-07	9.44E-06	1.22E-05	1.42E-05	2.35E-05	5.01E-06	8.46E-06
Pointe-Verte - Adult	1.43E-07	2.87E-07	2.17E-07	2.79E-07	4.80E-06	5.50E-06	1.81E-07	2.33E-07	6.60E-06	8.54E-06	1.37E-05	2.26E-05	6.52E-06	1.10E-05
Petit Rocher - Infant	2.28E-08	4.56E-08	2.33E-07	3.81E-07	7.68E-06	1.17E-05	7.12E-07	1.17E-06	3.40E-05	4.14E-05	8.33E-06	1.41E-05		
Petit Rocher - Toddler	5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.64E-06	1.17E-05	1.42E-06	2.32E-06	2.14E-05	2.60E-05	3.85E-06	6.52E-06	8.80E-06	1.49E-05
Petit Rocher - Child	3.92E-08	7.84E-08	1.30E-07	2.13E-07	5.11E-06	7.81E-06	1.78E-07	2.91E-07	1.64E-05	2.00E-05	2.83E-06	4.78E-06	6.49E-06	1.10E-05
Petit Rocher - Teen	2.35E-08	4.71E-08	1.04E-07	1.71E-07	3.52E-06	5.38E-06	9.78E-08	1.60E-07	1.28E-05	1.55E-05	1.91E-06	3.23E-06	5.01E-06	8.46E-06
Petit Rocher - Adult	1.99E-08	3.98E-08	9.91E-08	1.62E-07	4.46E-06	6.81E-06	8.26E-08	1.35E-07	8.93E-06	1.09E-05	1.84E-06	3.11E-06	6.52E-06	1.10E-05

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Lead	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	4.08E-05	1.00E-04	4.54E-06	7.75E-06	4.75E-05	6.54E-05	3.24E-04	5.54E-04	3.69E-05	2.73E-04	1.60E-05	4.36E-05		
Townsite - Toddler	8.99E-05	2.20E-04	3.33E-06	5.69E-06	4.72E-05	6.50E-05	6.45E-04	1.10E-03	2.32E-05	1.72E-04	7.41E-06	2.02E-05	9.06E-05	3.53E-04
Townsite - Child	7.03E-05	1.72E-04	2.53E-06	4.32E-06	3.16E-05	4.35E-05	8.08E-05	1.38E-04	1.79E-05	1.32E-04	5.44E-06	1.48E-05	6.68E-05	2.60E-04
Townsite - Teen	4.22E-05	1.03E-04	2.03E-06	3.47E-06	2.17E-05	3.00E-05	4.45E-05	7.60E-05	1.39E-05	1.03E-04	3.67E-06	9.98E-06	5.15E-05	2.01E-04
Townsite - Adult	3.56E-05	8.73E-05	1.93E-06	3.30E-06	2.75E-05	3.80E-05	3.76E-05	6.42E-05	9.71E-06	7.18E-05	3.54E-06	9.62E-06	6.71E-05	2.62E-04
Lower Belledune - Infant	3.45E-05	1.48E-04	3.94E-06	1.13E-05	4.75E-05	6.54E-05	2.82E-04	8.05E-04	3.25E-05	1.70E-04	3.14E-05	2.05E-04		
Lower Belledune - Toddler	7.59E-05	3.26E-04	2.90E-06	8.28E-06	4.72E-05	6.50E-05	5.60E-04	1.60E-03	2.04E-05	1.07E-04	1.45E-05	9.49E-05	9.06E-05	3.53E-04
Lower Belledune - Child	5.94E-05	2.55E-04	2.20E-06	6.28E-06	3.16E-05	4.35E-05	7.02E-05	2.01E-04	1.57E-05	8.22E-05	1.07E-05	6.96E-05	6.68E-05	2.60E-04
Lower Belledune - Teen	3.57E-05	1.53E-04	1.76E-06	5.04E-06	2.17E-05	3.00E-05	3.87E-05	1.11E-04	1.22E-05	6.38E-05	7.19E-06	4.70E-05	5.15E-05	2.01E-04
Lower Belledune - Adult	3.01E-05	1.29E-04	1.68E-06	4.80E-06	2.75E-05	3.80E-05	3.27E-05	9.34E-05	8.54E-06	4.46E-05	6.93E-06	4.53E-05	6.71E-05	2.62E-04
Belledune - Infant	1.04E-05	2.08E-05	1.67E-06	2.29E-06	4.75E-05	6.54E-05	1.20E-04	1.63E-04	2.44E-05	3.62E-05	1.92E-05	3.08E-05		
Belledune - Toddler	2.29E-05	4.58E-05	1.23E-06	1.68E-06	4.72E-05	6.50E-05	2.38E-04	3.25E-04	1.53E-05	2.28E-05	8.89E-06	1.42E-05	9.06E-05	2.27E-04
Belledune - Child	1.79E-05	3.58E-05	9.34E-07	1.27E-06	3.16E-05	4.35E-05	2.98E-05	4.07E-05	1.18E-05	1.75E-05	6.52E-06	1.04E-05	6.68E-05	1.67E-04
Belledune - Teen	1.08E-05	2.15E-05	7.49E-07	1.02E-06	2.17E-05	3.00E-05	1.64E-05	2.24E-05	9.16E-06	1.36E-05	4.40E-06	7.04E-06	5.15E-05	1.29E-04
Belledune - Adult	9.08E-06	1.82E-05	7.13E-07	9.74E-07	2.75E-05	3.80E-05	1.39E-05	1.89E-05	6.41E-06	9.51E-06	4.24E-06	6.79E-06	6.71E-05	1.68E-04
Pointe-Verte - Infant	9.00E-06	1.80E-05	1.54E-06	2.05E-06	9.11E-05	1.28E-04	1.10E-04	1.47E-04	8.13E-06	1.18E-05	1.60E-05	2.44E-05		
Pointe-Verte - Toddler	1.98E-05	3.96E-05	1.13E-06	1.51E-06	9.05E-05	1.27E-04	2.19E-04	2.92E-04	5.11E-06	7.43E-06	7.41E-06	1.13E-05	9.06E-05	2.27E-04
Pointe-Verte - Child	1.55E-05	3.10E-05	8.60E-07	1.15E-06	6.05E-05	8.52E-05	2.75E-05	3.66E-05	3.93E-06	5.72E-06	5.44E-06	8.26E-06	6.68E-05	1.67E-04
Pointe-Verte - Teen	9.31E-06	1.86E-05	6.90E-07	9.19E-07	4.17E-05	5.87E-05	1.51E-05	2.02E-05	3.05E-06	4.44E-06	3.67E-06	5.58E-06	5.15E-05	1.29E-04
Pointe-Verte - Adult	7.86E-06	1.57E-05	6.57E-07	8.75E-07	5.28E-05	7.43E-05	1.28E-05	1.70E-05	2.14E-06	3.11E-06	3.54E-06	5.38E-06	6.71E-05	1.68E-04
Petit Rocher - Infant	1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.07E-05	1.17E-04	5.83E-05	9.49E-05	1.03E-05	1.40E-05	4.74E-06	7.69E-06		
Petit Rocher - Toddler	2.82E-06	5.63E-06	5.99E-07	9.75E-07	6.04E-05	1.16E-04	1.16E-04	1.89E-04	6.50E-06	8.83E-06	2.19E-06	3.56E-06	9.06E-05	2.27E-04
Petit Rocher - Child	2.20E-06	4.41E-06	4.55E-07	7.40E-07	4.04E-05	7.76E-05	1.45E-05	2.36E-05	5.00E-06	6.79E-06	1.61E-06	2.61E-06	6.68E-05	1.67E-04
Petit Rocher - Teen	1.32E-06	2.65E-06	3.65E-07	5.94E-07	2.78E-05	5.35E-05	8.00E-06	1.30E-05	3.89E-06	5.27E-06	1.09E-06	1.76E-06	5.15E-05	1.29E-04
Petit Rocher - Adult	1.12E-06	2.23E-06	3.47E-07	5.65E-07	3.52E-05	6.77E-05	6.76E-06	1.10E-05	2.72E-06	3.69E-06	1.05E-06	1.70E-06	6.71E-05	1.68E-04

Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)
Fish		Lobster		Mussels		
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food
1.40E-06	1.71E-06					6.12E-04
3.68E-06	4.48E-06	3.78E-07	4.55E-07			7.26E-04
9.57E-06	1.17E-05	8.76E-07	1.06E-06	1.14E-04	1.83E-04	7.38E-04
5.27E-06	6.42E-06	4.83E-07	5.82E-07	6.28E-05	1.01E-04	4.53E-04
6.02E-06	7.33E-06	5.51E-07	6.64E-07	7.16E-05	1.15E-04	3.07E-04
1.40E-06	1.71E-06					6.12E-04
3.68E-06	4.48E-06	4.21E-07	4.72E-07			7.26E-04
9.57E-06	1.17E-05	9.77E-07	1.09E-06	1.97E-04	4.22E-04	7.38E-04
5.27E-06	6.42E-06	5.39E-07	6.03E-07	1.08E-04	2.32E-04	4.53E-04
6.02E-06	7.33E-06	6.15E-07	6.88E-07	1.24E-04	2.65E-04	3.07E-04
1.40E-06	1.71E-06					6.12E-04
3.68E-06	4.48E-06	4.10E-07	4.50E-07			7.26E-04
9.57E-06	1.17E-05	9.52E-07	1.04E-06	1.83E-04	2.39E-04	7.38E-04
5.27E-06	6.42E-06	5.25E-07	5.75E-07	1.01E-04	1.32E-04	4.53E-04
6.02E-06	7.33E-06	5.99E-07	6.56E-07	1.15E-04	1.50E-04	3.07E-04
1.40E-06	1.71E-06					6.12E-04
3.68E-06	4.48E-06	3.27E-07	5.55E-07			7.26E-04
9.57E-06	1.17E-05	7.58E-07	1.29E-06	1.14E-04	1.34E-04	7.38E-04
5.27E-06	6.42E-06	4.18E-07	7.10E-07	6.28E-05	7.36E-05	4.53E-04
6.02E-06	7.33E-06	4.76E-07	8.10E-07	7.16E-05	8.40E-05	3.07E-04
1.40E-06	1.71E-06					6.12E-04
3.68E-06	4.48E-06	3.78E-07	6.09E-07			7.26E-04
9.57E-06	1.17E-05	8.76E-07	1.41E-06	8.15E-05	9.98E-05	7.38E-04
5.27E-06	6.42E-06	4.83E-07	7.79E-07	4.49E-05	5.50E-05	4.53E-04
6.02E-06	7.33E-06	5.51E-07	8.89E-07	5.13E-05	6.28E-05	3.07E-04

TRV 1.00E-03 1.00E-03

Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
7.83E-07	1.98E-06	1.71E-06	2.83E-06	7.11E-04	9.45E-04	7.14E-04	9.50E-04
1.72E-06	4.35E-06	1.26E-06	2.08E-06	8.07E-04	9.64E-04	8.10E-04	9.71E-04
1.35E-06	3.40E-06	9.56E-07	1.58E-06	9.14E-04	1.10E-03	9.16E-04	1.10E-03
8.09E-07	2.04E-06	7.68E-07	1.27E-06	5.60E-04	6.86E-04	5.61E-04	6.90E-04
6.83E-07	1.72E-06	7.30E-07	1.20E-06	4.18E-04	5.31E-04	4.20E-04	5.34E-04
6.53E-07	2.86E-06	1.46E-06	4.04E-06	7.09E-04	1.00E-03	7.11E-04	1.01E-03
1.44E-06	6.29E-06	1.07E-06	2.97E-06	8.04E-04	9.82E-04	8.07E-04	9.91E-04
1.12E-06	4.92E-06	8.15E-07	2.25E-06	9.95E-04	1.34E-03	9.97E-04	1.35E-03
6.75E-07	2.95E-06	6.54E-07	1.81E-06	6.04E-04	8.18E-04	6.06E-04	8.23E-04
5.70E-07	2.49E-06	6.22E-07	1.72E-06	4.70E-04	6.90E-04	4.71E-04	6.94E-04
1.96E-07	3.92E-07	5.70E-07	7.48E-07	7.06E-04	7.39E-04	7.07E-04	7.41E-04
4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.98E-04	8.24E-04	7.99E-04	8.25E-04
3.37E-07	6.74E-07	3.18E-07	4.17E-07	9.80E-04	1.06E-03	9.81E-04	1.06E-03
2.02E-07	4.05E-07	2.55E-07	3.35E-07	5.96E-04	6.41E-04	5.96E-04	6.42E-04
1.71E-07	3.42E-07	2.43E-07	3.19E-07	4.61E-04	5.10E-04	4.61E-04	5.11E-04
1.64E-07	3.29E-07	5.08E-07	6.56E-07	7.11E-04	7.60E-04	7.11E-04	7.61E-04
3.62E-07	7.23E-07	3.73E-07	4.82E-07	7.95E-04	8.27E-04	7.95E-04	8.28E-04
2.83E-07	5.65E-07	2.84E-07	3.66E-07	9.08E-04	9.53E-04	9.08E-04	9.54E-04
1.70E-07	3.40E-07	2.28E-07	2.93E-07	5.54E-04	5.82E-04	5.55E-04	5.83E-04
1.43E-07	2.87E-07	2.17E-07	2.79E-07	4.17E-04	4.47E-04	4.17E-04	4.48E-04
2.28E-08	4.56E-08	2.33E-07	3.81E-07	6.64E-04	6.82E-04	6.64E-04	6.83E-04
5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.73E-04	7.92E-04	7.73E-04	7.93E-04
3.92E-08	7.84E-08	1.30E-07	2.13E-07	8.61E-04	8.95E-04	8.61E-04	8.95E-04
2.35E-08	4.71E-08	1.04E-07	1.71E-07	5.27E-04	5.48E-04	5.27E-04	5.48E-04
1.99E-08	3.98E-08	9.91E-08	1.62E-07	3.87E-04	4.10E-04	3.87E-04	4.10E-04

Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)
Fish		Lobster		Mussels		
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food
1.77E-06	2.38E-06					4.69E-04
4.64E-06	6.24E-06	3.05E-06	6.21E-06			4.81E-04
1.21E-05	1.62E-05	7.09E-06	1.44E-05	1.83E-04	5.06E-04	3.68E-04
6.65E-06	8.94E-06	3.90E-06	7.94E-06	1.01E-04	2.79E-04	2.24E-04
7.59E-06	1.02E-05	4.46E-06	9.06E-06	1.15E-04	3.18E-04	1.83E-04
1.77E-06	2.38E-06					4.69E-04
4.64E-06	6.24E-06	5.42E-06	6.91E-06			4.81E-04
1.21E-05	1.62E-05	1.26E-05	1.60E-05	4.22E-03	1.69E-02	3.68E-04
6.65E-06	8.94E-06	6.92E-06	8.84E-06	2.32E-03	9.30E-03	2.24E-04
7.59E-06	1.02E-05	7.90E-06	1.01E-05	2.65E-03	1.06E-02	1.83E-04
1.77E-06	2.38E-06					4.69E-04
4.64E-06	6.24E-06	4.83E-06	6.13E-06			4.81E-04
1.21E-05	1.62E-05	1.12E-05	1.42E-05	3.37E-03	5.76E-03	3.68E-04
6.65E-06	8.94E-06	6.17E-06	7.83E-06	1.86E-03	3.18E-03	2.24E-04
7.59E-06	1.02E-05	7.04E-06	8.94E-06	2.12E-03	3.62E-03	1.83E-04
1.77E-06	2.38E-06					4.69E-04
4.64E-06	6.24E-06	3.35E-06	5.45E-06			4.81E-04
1.21E-05	1.62E-05	7.77E-06	1.26E-05	9.56E-04	1.39E-03	3.68E-04
6.65E-06	8.94E-06	4.28E-06	6.96E-06	5.27E-04	7.67E-04	2.24E-04
7.59E-06	1.02E-05	4.89E-06	7.95E-06	6.01E-04	8.75E-04	1.83E-04
1.77E-06	2.38E-06					4.69E-04
4.64E-06	6.24E-06	3.18E-06	6.02E-06			4.81E-04
1.21E-05	1.62E-05	7.38E-06	1.40E-05	2.25E-04	3.37E-04	3.68E-04
6.65E-06	8.94E-06	4.07E-06	7.69E-06	1.24E-04	1.86E-04	2.24E-04
7.59E-06	1.02E-05	4.64E-06	8.78E-06	1.41E-04	2.12E-04	1.83E-04

TRV 3.60E-03 3.60E-03

Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
4.08E-05	1.00E-04	4.54E-06	7.75E-06	8.96E-04	1.41E-03	9.41E-04	1.52E-03
8.99E-05	2.20E-04	3.33E-06	5.69E-06	1.30E-03	2.20E-03	1.40E-03	2.43E-03
7.03E-05	1.72E-04	2.53E-06	4.32E-06	7.72E-04	1.49E-03	8.45E-04	1.67E-03
4.22E-05	1.03E-04	2.03E-06	3.47E-06	4.71E-04	9.39E-04	5.15E-04	1.05E-03
3.56E-05	8.73E-05	1.93E-06	3.30E-06	4.56E-04	9.66E-04	4.93E-04	1.06E-03
3.45E-05	1.48E-04	3.94E-06	1.13E-05	8.64E-04	1.72E-03	9.02E-04	1.88E-03
7.59E-05	3.26E-04	2.90E-06	8.28E-06	1.22E-03	2.71E-03	1.30E-03	3.05E-03
5.94E-05	2.55E-04	2.20E-06	6.28E-06	4.80E-03	1.79E-02	4.87E-03	1.82E-02
3.57E-05	1.53E-04	1.76E-06	5.04E-06	2.69E-03	9.99E-03	2.73E-03	1.01E-02
3.01E-05	1.29E-04	1.68E-06	4.80E-06	2.99E-03	1.13E-02	3.03E-03	1.14E-02
1.04E-05	2.08E-05	1.67E-06	2.29E-06	6.82E-04	7.67E-04	6.94E-04	7.90E-04
2.29E-05	4.58E-05	1.23E-06	1.68E-06	8.90E-04	1.15E-03	9.14E-04	1.19E-03
1.79E-05	3.58E-05	9.34E-07	1.27E-06	3.91E-03	6.44E-03	3.93E-03	6.48E-03
1.08E-05	2.15E-05	7.49E-07	1.02E-06	2.20E-03	3.62E-03	2.21E-03	3.64E-03
9.08E-06	1.82E-05	7.13E-07	9.74E-07	2.44E-03	4.07E-03	2.45E-03	4.09E-03
9.00E-06	1.80E-05	1.54E-06	2.05E-06	6.96E-04	7.83E-04	7.07E-04	8.03E-04
1.98E-05	3.96E-05	1.13E-06	1.51E-06	9.02E-04	1.16E-03	9.23E-04	1.20E-03
1.55E-05	3.10E-05	8.60E-07	1.15E-06	1.51E-03	2.09E-03	1.52E-03	2.12E-03
9.31E-06	1.86E-05	6.90E-07	9.19E-07	8.77E-04	1.22E-03	8.87E-04	1.24E-03
7.86E-06	1.57E-05	6.57E-07	8.75E-07	9.35E-04	1.34E-03	9.44E-04	1.36E-03
1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.05E-04	7.05E-04	6.07E-04	7.09E-04
2.82E-06	5.63E-06	5.99E-07	9.75E-07	7.64E-04	1.04E-03	7.68E-04	1.04E-03
2.20E-06	4.41E-06	4.55E-07	7.40E-07	7.41E-04	1.01E-03	7.43E-04	1.02E-03
1.32E-06	2.65E-06	3.65E-07	5.94E-07	4.51E-04	6.29E-04	4.53E-04	6.32E-04
1.12E-06	2.23E-06	3.47E-07	5.65E-07	4.50E-04	6.66E-04	4.51E-04	6.69E-04

TABLE F4.6
SUMMARY TABLES FOR ASSESSMENT 4

[illegible]vis[illegible] EP[illegible] M[illegible] an[illegible]
Backyard Fruits

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Cadmium	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	7.83E-07	1.98E-06	1.71E-06	2.83E-06	8.00E-06	8.67E-06	5.25E-06	8.66E-06	6.58E-05	2.51E-04	1.86E-05	6.28E-05		
Townsite - Toddler	1.72E-06	4.35E-06	1.26E-06	2.08E-06	7.95E-06	8.61E-06	1.04E-05	1.72E-05	4.13E-05	1.58E-04	8.60E-06	2.90E-05	8.80E-06	2.06E-05
Townsite - Child	1.35E-06	3.40E-06	9.56E-07	1.58E-06	5.32E-06	5.76E-06	1.31E-06	2.16E-06	3.18E-05	1.21E-04	6.31E-06	2.13E-05	6.49E-06	1.52E-05
Townsite - Teen	8.09E-07	2.04E-06	7.68E-07	1.27E-06	3.66E-06	3.97E-06	7.22E-07	1.19E-06	2.47E-05	9.44E-05	4.26E-06	1.44E-05	5.01E-06	1.17E-05
Townsite - Adult	6.83E-07	1.72E-06	7.30E-07	1.20E-06	4.64E-06	5.03E-06	6.09E-07	1.00E-06	1.73E-05	6.60E-05	4.10E-06	1.39E-05	6.52E-06	1.53E-05
Lower Belledune - Infant	6.53E-07	2.86E-06	1.46E-06	4.04E-06	8.00E-06	8.67E-06	4.48E-06	1.24E-05	6.06E-05	1.63E-04	2.24E-05	2.05E-04		
Lower Belledune - Toddler	1.44E-06	6.29E-06	1.07E-06	2.97E-06	7.95E-06	8.61E-06	8.90E-06	2.46E-05	3.81E-05	1.02E-04	1.04E-05	9.49E-05	8.80E-06	2.06E-05
Lower Belledune - Child	1.12E-06	4.92E-06	8.15E-07	2.25E-06	5.32E-06	5.76E-06	1.12E-06	3.08E-06	2.93E-05	7.86E-05	7.61E-06	6.96E-05	6.49E-06	1.52E-05
Lower Belledune - Teen	6.75E-07	2.95E-06	6.54E-07	1.81E-06	3.66E-06	3.97E-06	6.15E-07	1.70E-06	2.28E-05	6.11E-05	5.14E-06	4.70E-05	5.01E-06	1.17E-05
Lower Belledune - Adult	5.70E-07	2.49E-06	6.22E-07	1.72E-06	4.64E-06	5.03E-06	5.19E-07	1.43E-06	1.59E-05	4.27E-05	4.95E-06	4.53E-05	6.52E-06	1.53E-05
Belledune - Infant	1.96E-07	3.92E-07	5.70E-07	7.48E-07	8.00E-06	8.67E-06	1.75E-06	2.29E-06	5.76E-05	7.24E-05	2.50E-05	4.23E-05		
Belledune - Toddler	4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.95E-06	8.61E-06	3.47E-06	4.56E-06	3.62E-05	4.55E-05	1.16E-05	1.96E-05	8.80E-06	1.49E-05
Belledune - Child	3.37E-07	6.74E-07	3.18E-07	4.17E-07	5.32E-06	5.76E-06	4.35E-07	5.71E-07	2.79E-05	3.50E-05	8.48E-06	1.44E-05	6.49E-06	1.10E-05
Belledune - Teen	2.02E-07	4.05E-07	2.55E-07	3.35E-07	3.66E-06	3.97E-06	2.40E-07	3.15E-07	2.17E-05	2.72E-05	5.72E-06	9.68E-06	5.01E-06	8.46E-06
Belledune - Adult	1.71E-07	3.42E-07	2.43E-07	3.19E-07	4.64E-06	5.03E-06	2.03E-07	2.66E-07	1.51E-05	1.90E-05	5.52E-06	9.34E-06	6.52E-06	1.10E-05
Pointe-Verte - Infant	1.64E-07	3.29E-07	5.08E-07	6.56E-07	8.28E-06	9.48E-06	1.56E-06	2.01E-06	2.51E-05	3.25E-05	6.22E-05	1.03E-04		
Pointe-Verte - Toddler	3.62E-07	7.23E-07	3.73E-07	4.82E-07	8.23E-06	9.43E-06	3.10E-06	3.99E-06	1.58E-05	2.04E-05	2.88E-05	4.74E-05	8.80E-06	1.49E-05
Pointe-Verte - Child	2.83E-07	5.65E-07	2.84E-07	3.66E-07	5.50E-06	6.30E-06	3.88E-07	5.00E-07	1.21E-05	1.57E-05	2.11E-05	3.48E-05	6.49E-06	1.10E-05
Pointe-Verte - Teen	1.70E-07	3.40E-07	2.28E-07	2.93E-07	3.79E-06	4.34E-06	2.14E-07	2.76E-07	9.44E-06	1.22E-05	1.42E-05	2.35E-05	5.01E-06	8.46E-06
Pointe-Verte - Adult	1.43E-07	2.87E-07	2.17E-07	2.79E-07	4.80E-06	5.50E-06	1.81E-07	2.33E-07	6.60E-06	8.54E-06	1.37E-05	2.26E-05	6.52E-06	1.10E-05
Petit Rocher - Infant	2.28E-08	4.56E-08	2.33E-07	3.81E-07	7.68E-06	1.17E-05	7.12E-07	1.17E-06	3.40E-05	4.14E-05	8.33E-06	1.41E-05		
Petit Rocher - Toddler	5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.64E-06	1.17E-05	1.42E-06	2.32E-06	2.14E-05	2.60E-05	3.85E-06	6.52E-06	8.80E-06	1.49E-05
Petit Rocher - Child	3.92E-08	7.84E-08	1.30E-07	2.13E-07	5.11E-06	7.81E-06	1.78E-07	2.91E-07	1.64E-05	2.00E-05	2.83E-06	4.78E-06	6.49E-06	1.10E-05
Petit Rocher - Teen	2.35E-08	4.71E-08	1.04E-07	1.71E-07	3.52E-06	5.38E-06	9.78E-08	1.60E-07	1.28E-05	1.55E-05	1.91E-06	3.23E-06	5.01E-06	8.46E-06
Petit Rocher - Adult	1.99E-08	3.98E-08	9.91E-08	1.62E-07	4.46E-06	6.81E-06	8.26E-08	1.35E-07	8.93E-06	1.09E-05	1.84E-06	3.11E-06	6.52E-06	1.10E-05

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Lead	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	4.08E-05	1.00E-04	4.54E-06	7.75E-06	4.75E-05	6.54E-05	3.24E-04	5.54E-04	3.69E-05	2.73E-04	1.60E-05	4.36E-05		
Townsite - Toddler	8.99E-05	2.20E-04	3.33E-06	5.69E-06	4.72E-05	6.50E-05	6.45E-04	1.10E-03	2.32E-05	1.72E-04	7.41E-06	2.02E-05	9.06E-05	3.53E-04
Townsite - Child	7.03E-05	1.72E-04	2.53E-06	4.32E-06	3.16E-05	4.35E-05	8.08E-05	1.38E-04	1.79E-05	1.32E-04	5.44E-06	1.48E-05	6.68E-05	2.60E-04
Townsite - Teen	4.22E-05	1.03E-04	2.03E-06	3.47E-06	2.17E-05	3.00E-05	4.45E-05	7.60E-05	1.39E-05	1.03E-04	3.67E-06	9.98E-06	5.15E-05	2.01E-04
Townsite - Adult	3.56E-05	8.73E-05	1.93E-06	3.30E-06	2.75E-05	3.80E-05	3.76E-05	6.42E-05	9.71E-06	7.18E-05	3.54E-06	9.62E-06	6.71E-05	2.62E-04
Lower Belledune - Infant	3.45E-05	1.48E-04	3.94E-06	1.13E-05	4.75E-05	6.54E-05	2.82E-04	8.05E-04	3.25E-05	1.70E-04	3.14E-05	2.05E-04		
Lower Belledune - Toddler	7.59E-05	3.26E-04	2.90E-06	8.28E-06	4.72E-05	6.50E-05	5.60E-04	1.60E-03	2.04E-05	1.07E-04	1.45E-05	9.49E-05	9.06E-05	3.53E-04
Lower Belledune - Child	5.94E-05	2.55E-04	2.20E-06	6.28E-06	3.16E-05	4.35E-05	7.02E-05	2.01E-04	1.57E-05	8.22E-05	1.07E-05	6.96E-05	6.68E-05	2.60E-04
Lower Belledune - Teen	3.57E-05	1.53E-04	1.76E-06	5.04E-06	2.17E-05	3.00E-05	3.87E-05	1.11E-04	1.22E-05	6.38E-05	7.19E-06	4.70E-05	5.15E-05	2.01E-04
Lower Belledune - Adult	3.01E-05	1.29E-04	1.68E-06	4.80E-06	2.75E-05	3.80E-05	3.27E-05	9.34E-05	8.54E-06	4.46E-05	6.93E-06	4.53E-05	6.71E-05	2.62E-04
Belledune - Infant	1.04E-05	2.08E-05	1.67E-06	2.29E-06	4.75E-05	6.54E-05	1.20E-04	1.63E-04	2.44E-05	3.62E-05	1.92E-05	3.08E-05		
Belledune - Toddler	2.29E-05	4.58E-05	1.23E-06	1.68E-06	4.72E-05	6.50E-05	2.38E-04	3.25E-04	1.53E-05	2.28E-05	8.89E-06	1.42E-05	9.06E-05	2.27E-04
Belledune - Child	1.79E-05	3.58E-05	9.34E-07	1.27E-06	3.16E-05	4.35E-05	2.98E-05	4.07E-05	1.18E-05	1.75E-05	6.52E-06	1.04E-05	6.68E-05	1.67E-04
Belledune - Teen	1.08E-05	2.15E-05	7.49E-07	1.02E-06	2.17E-05	3.00E-05	1.64E-05	2.24E-05	9.16E-06	1.36E-05	4.40E-06	7.04E-06	5.15E-05	1.29E-04
Belledune - Adult	9.08E-06	1.82E-05	7.13E-07	9.74E-07	2.75E-05	3.80E-05	1.39E-05	1.89E-05	6.41E-06	9.51E-06	4.24E-06	6.79E-06	6.71E-05	1.68E-04
Pointe-Verte - Infant	9.00E-06	1.80E-05	1.54E-06	2.05E-06	9.11E-05	1.28E-04	1.10E-04	1.47E-04	8.13E-06	1.18E-05	1.60E-05	2.44E-05		
Pointe-Verte - Toddler	1.98E-05	3.96E-05	1.13E-06	1.51E-06	9.05E-05	1.27E-04	2.19E-04	2.92E-04	5.11E-06	7.43E-06	7.41E-06	1.13E-05	9.06E-05	2.27E-04
Pointe-Verte - Child	1.55E-05	3.10E-05	8.60E-07	1.15E-06	6.05E-05	8.52E-05	2.75E-05	3.66E-05	3.93E-06	5.72E-06	5.44E-06	8.26E-06	6.68E-05	1.67E-04
Pointe-Verte - Teen	9.31E-06	1.86E-05	6.90E-07	9.19E-07	4.17E-05	5.87E-05	1.51E-05	2.02E-05	3.05E-06	4.44E-06	3.67E-06	5.58E-06	5.15E-05	1.29E-04
Pointe-Verte - Adult	7.86E-06	1.57E-05	6.57E-07	8.75E-07	5.28E-05	7.43E-05	1.28E-05	1.70E-05	2.14E-06	3.11E-06	3.54E-06	5.38E-06	6.71E-05	1.68E-04
Petit Rocher - Infant	1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.07E-05	1.17E-04	5.83E-05	9.49E-05	1.03E-05	1.40E-05	4.74E-06	7.69E-06		
Petit Rocher - Toddler	2.82E-06	5.63E-06	5.99E-07	9.75E-07	6.04E-05	1.16E-04	1.16E-04	1.89E-04	6.50E-06	8.83E-06	2.19E-06	3.56E-06	9.06E-05	2.27E-04
Petit Rocher - Child	2.20E-06	4.41E-06	4.55E-07	7.40E-07	4.04E-05	7.76E-05	1.45E-05	2.36E-05	5.00E-06	6.79E-06	1.61E-06	2.61E-06	6.68E-05	1.67E-04
Petit Rocher - Teen	1.32E-06	2.65E-06	3.65E-07	5.94E-07	2.78E-05	5.35E-05	8.00E-06	1.30E-05	3.89E-06	5.27E-06	1.09E-06	1.76E-06	5.15E-05	1.29E-04
Petit Rocher - Adult	1.12E-06	2.23E-06	3.47E-07	5.65E-07	3.52E-05	6.77E-05	6.76E-06	1.10E-05	2.72E-06	3.69E-06	1.05E-06	1.70E-06	6.71E-05	1.68E-04

Revised EPCs - Marine Fish and Backyard Fruits

TRV 1.00E-03 (Total Dermal) 1.00E-03 (Total Ingestion)

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
	Fruit		Fish		Lobster		Mussels										
Cadmium	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant			1.40E-06	1.71E-06					6.12E-04	7.83E-07	1.98E-06	1.71E-06	2.83E-06	7.11E-04	9.45E-04	7.14E-04	9.50E-04
Townsite - Toddler			3.68E-06	4.48E-06	3.78E-07	4.55E-07			7.26E-04	1.72E-06	4.35E-06	1.26E-06	2.08E-06	8.07E-04	9.64E-04	8.10E-04	9.71E-04
Townsite - Child			9.57E-06	1.17E-05	8.76E-07	1.06E-06	1.14E-04	1.83E-04	7.38E-04	1.35E-06	3.40E-06	9.56E-07	1.58E-06	9.14E-04	1.10E-03	9.16E-04	1.10E-03
Townsite - Teen			5.27E-06	6.42E-06	4.83E-07	5.82E-07	6.28E-05	1.01E-04	4.53E-04	8.09E-07	2.04E-06	7.68E-07	1.27E-06	5.60E-04	6.86E-04	5.61E-04	6.90E-04
Townsite - Adult			6.02E-06	7.33E-06	5.51E-07	6.64E-07	7.16E-05	1.15E-04	3.07E-04	6.83E-07	1.72E-06	7.30E-07	1.20E-06	4.18E-04	5.31E-04	4.20E-04	5.34E-04
Lower Belledune - Infant			1.40E-06	1.71E-06					6.12E-04	6.53E-07	2.86E-06	1.46E-06	4.04E-06	7.09E-04	1.00E-03	7.11E-04	1.01E-03
Lower Belledune - Toddler			3.68E-06	4.48E-06	4.21E-07	4.72E-07			7.26E-04	1.44E-06	6.29E-06	1.07E-06	2.97E-06	8.04E-04	9.82E-04	8.07E-04	9.91E-04
Lower Belledune - Child			9.57E-06	1.17E-05	9.77E-07	1.09E-06	1.97E-04	4.22E-04	7.38E-04	1.12E-06	4.92E-06	8.15E-07	2.25E-06	9.95E-04	1.34E-03	9.97E-04	1.35E-03
Lower Belledune - Teen			5.27E-06	6.42E-06	5.39E-07	6.03E-07	1.08E-04	2.32E-04	4.53E-04	6.75E-07	2.95E-06	6.54E-07	1.81E-06	6.04E-04	8.18E-04	6.06E-04	8.23E-04
Lower Belledune - Adult			6.02E-06	7.33E-06	6.15E-07	6.88E-07	1.24E-04	2.65E-04	3.07E-04	5.70E-07	2.49E-06	6.22E-07	1.72E-06	4.70E-04	6.90E-04	4.71E-04	6.94E-04
Belledune - Infant			1.40E-06	1.71E-06					6.12E-04	1.96E-07	3.92E-07	5.70E-07	7.48E-07	7.06E-04	7.39E-04	7.07E-04	7.41E-04
Belledune - Toddler			3.68E-06	4.48E-06	4.10E-07	4.50E-07			7.26E-04	4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.98E-04	8.24E-04	7.99E-04	8.25E-04
Belledune - Child			9.57E-06	1.17E-05	9.52E-07	1.04E-06	1.83E-04	2.39E-04	7.38E-04	3.37E-07	6.74E-07	3.18E-07	4.17E-07	9.80E-04	1.06E-03	9.81E-04	1.06E-03
Belledune - Teen			5.27E-06	6.42E-06	5.25E-07	5.75E-07	1.01E-04	1.32E-04	4.53E-04	2.02E-07	4.05E-07	2.55E-07	3.35E-07	5.96E-04	6.41E-04	5.96E-04	6.42E-04
Belledune - Adult			6.02E-06	7.33E-06	5.99E-07	6.56E-07	1.15E-04	1.50E-04	3.07E-04	1.71E-07	3.42E-07	2.43E-07	3.19E-07	4.61E-04	5.10E-04	4.61E-04	5.11E-04
Pointe-Verte - Infant			1.40E-06	1.71E-06					6.12E-04	1.64E-07	3.29E-07	5.08E-07	6.56E-07	7.11E-04	7.60E-04	7.11E-04	7.61E-04
Pointe-Verte - Toddler			3.68E-06	4.48E-06	3.27E-07	5.55E-07			7.26E-04	3.62E-07	7.23E-07	3.73E-07	4.82E-07	7.95E-04	8.27E-04	7.95E-04	8.28E-04
Pointe-Verte - Child			9.57E-06	1.17E-05	7.58E-07	1.29E-06	1.14E-04	1.34E-04	7.38E-04	2.83E-07	5.65E-07	2.84E-07	3.66E-07	9.08E-04	9.53E-04	9.08E-04	9.54E-04
Pointe-Verte - Teen			5.27E-06	6.42E-06	4.18E-07	7.10E-07	6.28E-05	7.36E-05	4.53E-04	1.70E-07	3.40E-07	2.28E-07	2.93E-07	5.54E-04	5.82E-04	5.55E-04	5.83E-04
Pointe-Verte - Adult			6.02E-06	7.33E-06	4.76E-07	8.10E-07	7.16E-05	8.40E-05	3.07E-04	1.43E-07	2.87E-07	2.17E-07	2.79E-07	4.17E-04	4.47E-04	4.17E-04	4.48E-04
Petit Rocher - Infant			1.40E-06	1.71E-06					6.12E-04	2.28E-08	4.56E-08	2.33E-07	3.81E-07	6.64E-04	6.82E-04	6.64E-04	6.83E-04
Petit Rocher - Toddler			3.68E-06	4.48E-06	3.78E-07	6.09E-07			7.26E-04	5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.73E-04	7.92E-04	7.73E-04	7.93E-04
Petit Rocher - Child			9.57E-06	1.17E-05	8.76E-07	1.41E-06	8.15E-05	9.98E-05	7.38E-04	3.92E-08	7.84E-08	1.30E-07	2.13E-07	8.61E-04	8.95E-04	8.61E-04	8.95E-04
Petit Rocher - Teen			5.27E-06	6.42E-06	4.83E-07	7.79E-07	4.49E-05	5.50E-05	4.53E-04	2.35E-08	4.71E-08	1.04E-07	1.71E-07	5.27E-04	5.48E-04	5.27E-04	5.48E-04
Petit Rocher - Adult			6.02E-06	7.33E-06	5.51E-07	8.89E-07	5.13E-05	6.28E-05	3.07E-04	1.99E-08	3.98E-08	9.91E-08	1.62E-07	3.87E-04	4.10E-04	3.87E-04	4.10E-04

TRV 3.60E-03 (Total Dermal) 3.60E-03 (Total Ingestion)

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
	Fruit		Fish		Lobster		Mussels										
Lead	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant			1.77E-06	2.38E-06					4.69E-04	4.08E-05	1.00E-04	4.54E-06	7.75E-06	8.96E-04	1.41E-03	9.41E-04	1.52E-03
Townsite - Toddler			4.64E-06	6.24E-06	3.05E-06	6.21E-06			4.81E-04	8.99E-05	2.20E-04	3.33E-06	5.69E-06	1.30E-03	2.20E-03	1.40E-03	2.43E-03
Townsite - Child			1.21E-05	1.62E-05	7.09E-06	1.44E-05	1.83E-04	5.06E-04	3.68E-04	7.03E-05	1.72E-04	2.53E-06	4.32E-06	7.72E-04	1.49E-03	8.45E-04	1.67E-03
Townsite - Teen			6.65E-06	8.94E-06	3.90E-06	7.94E-06	1.01E-04	2.79E-04	2.24E-04	4.22E-05	1.03E-04	2.03E-06	3.47E-06	4.71E-04	9.39E-04	5.15E-04	1.05E-03
Townsite - Adult			7.59E-06	1.02E-05	4.46E-06	9.06E-06	1.15E-04	3.18E-04	1.83E-04	3.56E-05	8.73E-05	1.93E-06	3.30E-06	4.56E-04	9.66E-04	4.93E-04	1.06E-03
Lower Belledune - Infant			1.77E-06	2.38E-06					4.69E-04	3.45E-05	1.48E-04	3.94E-06	1.13E-05	8.64E-04	1.72E-03	9.02E-04	1.88E-03
Lower Belledune - Toddler			4.64E-06	6.24E-06	5.42E-06	6.91E-06			4.81E-04	7.59E-05	3.26E-04	2.90E-06	8.28E-06	1.22E-03	2.71E-03	1.30E-03	3.05E-03
Lower Belledune - Child			1.21E-05	1.62E-05	1.26E-05	1.60E-05	4.22E-03	1.69E-02	3.68E-04	5.94E-05	2.55E-04	2.20E-06	6.28E-06	4.80E-03	1.79E-02	4.87E-03	1.82E-02
Lower Belledune - Teen			6.65E-06	8.94E-06	6.92E-06	8.84E-06	2.32E-03	9.30E-03	2.24E-04	3.57E-05	1.53E-04	1.76E-06	5.04E-06	2.69E-03	9.99E-03	2.73E-03	1.01E-02
Lower Belledune - Adult			7.59E-06	1.02E-05	7.90E-06	1.01E-05	2.65E-03	1.06E-02	1.83E-04	3.01E-05	1.29E-04	1.68E-06	4.80E-06	2.99E-03	1.13E-02	3.03E-03	1.14E-02
Belledune - Infant			1.77E-06	2.38E-06					4.69E-04	1.04E-05	2.08E-05	1.67E-06	2.29E-06	6.82E-04	7.67E-04	6.94E-04	7.90E-04
Belledune - Toddler			4.64E-06	6.24E-06	4.83E-06	6.13E-06			4.81E-04	2.29E-05	4.58E-05	1.23E-06	1.68E-06	8.90E-04	1.15E-03	9.14E-04	1.19E-03
Belledune - Child			1.21E-05	1.62E-05	1.12E-05	1.42E-05	3.37E-03	5.76E-03	3.68E-04	1.79E-05	3.58E-05	9.34E-07	1.27E-06	3.91E-03	6.44E-03	3.93E-03	6.48E-03
Belledune - Teen			6.65E-06	8.94E-06	6.17E-06	7.83E-06	1.86E-03	3.18E-03	2.24E-04	1.08E-05	2.15E-05	7.49E-07	1.02E-06	2.20E-03	3.62E-03	2.21E-03	3.64E-03
Belledune - Adult			7.59E-06	1.02E-05	7.04E-06	8.94E-06	2.12E-03	3.62E-03	1.83E-04	9.08E-06	1.82E-05	7.13E-07	9.74E-07	2.44E-03	4.07E-03	2.45E-03	4.09E-03
Pointe-Verte - Infant			1.77E-06	2.38E-06					4.69E-04	9.00E-06	1.80E-05	1.54E-06	2.05E-06	6.96E-04	7.83E-04	7.07E-04	8.03E-04
Pointe-Verte - Toddler			4.64E-06	6.24E-06	3.35E-06	5.45E-06			4.81E-04	1.98E-05	3.96E-05	1.13E-06	1.51E-06	9.02E-04	1.16E-03	9.23E-04	1.20E-03
Pointe-Verte - Child			1.21E-05	1.62E-05	7.77E-06	1.26E-05	9.56E-04	1.39E-03	3.68E-04	1.55E-05	3.10E-05	8.60E-07	1.15E-06	1.51E-03	2.09E-03	1.52E-03	2.12E-03
Pointe-Verte - Teen			6.65E-06	8.94E-06	4.28E-06	6.96E-06	5.27E-04	7.67E-04	2.24E-04	9.31E-06	1.86E-05	6.90E-07	9.19E-07	8.77E-04	1.22E-03	8.87E-04	1.24E-03
Pointe-Verte - Adult			7.59E-06	1.02E-05	4.89E-06	7.95E-06	6.01E-04	8.75E-04	1.83E-04	7.86E-06	1.57E-05	6.57E-07	[illegible]	9.35E-04	1.34E-03	9.44E-04	1.36E-03
Petit Rocher - Infant			1.77E-06	2.38E-06					4.69E-04	1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.05E-04	7.05E-04	6.07E-04	7.09E-04
Petit Rocher - Toddler			4.64E-06	6.24E-06	3.18E-06	6.02E-06			4.81E-04	2.82E-06	5.63E-06	5.99E-07	9.75E-07	7.64E-04	1.04E-03	7.68E-04	1.04E-03
Petit Rocher - Child			1.21E-05	1.62E-05	7.38E-06	1.40E-05	2.25E-04	3.37E-04	3.68E-04	2.20E-06	4.41E-06	4.55E-07	7.40E-07	7.41E-04	1.01E-03	7.43E-04	1.02E-03
Petit Rocher - Teen			6.65E-06	8.94E-06	4.07E-06	7.69E-06	1.24E-04	1.86E-04	2.24E-04	1.32E-06	2.65E-06	3.65E-07	5.94E-07	4.51E-04	6.29E-04	4.53E-04	6.32E-04
Petit Rocher - Adult			7.59E-06	1.02E-05	4.64E-06	8.78E-06	1.41E-04	2.12E-04	1.83E-04	1.12E-06	2.23E-06	3.47E-07	5.65E-07	4.50E-04	6.66E-04	4.51E-04	6.69E-04

TABLE F4.7
SUMMARY TABLES FOR ASSESSMENT 1 WITHOUT THE MUSSEL EXPOSURE PATHWAY

Revised EPCs - Marine Fish (No Mussel)

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Cadmium	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	7.83E-07	1.98E-06	1.71E-06	2.83E-06	8.00E-06	8.67E-06	5.25E-06	8.66E-06	6.58E-05	2.51E-04	1.86E-05	6.28E-05		
Townsite - Toddler	1.72E-06	4.35E-06	1.26E-06	2.08E-06	7.95E-06	8.61E-06	1.04E-05	1.72E-05	4.13E-05	1.58E-04	8.60E-06	2.90E-05	8.80E-06	2.06E-05
Townsite - Child	1.35E-06	3.40E-06	9.56E-07	1.58E-06	5.32E-06	5.76E-06	1.31E-06	2.16E-06	3.18E-05	1.21E-04	6.31E-06	2.13E-05	6.49E-06	1.52E-05
Townsite - Teen	8.09E-07	2.04E-06	7.68E-07	1.27E-06	3.66E-06	3.97E-06	7.22E-07	1.19E-06	2.47E-05	9.44E-05	4.26E-06	1.44E-05	5.01E-06	1.17E-05
Townsite - Adult	6.83E-07	1.72E-06	7.30E-07	1.20E-06	4.64E-06	5.03E-06	6.09E-07	1.00E-06	1.73E-05	6.60E-05	4.10E-06	1.39E-05	6.52E-06	1.53E-05
Lower Belledune - Infant	6.53E-07	2.86E-06	1.46E-06	4.04E-06	8.00E-06	8.67E-06	4.48E-06	1.24E-05	6.06E-05	1.63E-04	2.24E-05	2.05E-04		
Lower Belledune - Toddler	1.44E-06	6.29E-06	1.07E-06	2.97E-06	7.95E-06	8.61E-06	8.90E-06	2.46E-05	3.81E-05	1.02E-04	1.04E-05	9.49E-05	8.80E-06	2.06E-05
Lower Belledune - Child	1.12E-06	4.92E-06	8.15E-07	2.25E-06	5.32E-06	5.76E-06	1.12E-06	3.08E-06	2.93E-05	7.86E-05	7.61E-06	6.96E-05	6.49E-06	1.52E-05
Lower Belledune - Teen	6.75E-07	2.95E-06	6.54E-07	1.81E-06	3.66E-06	3.97E-06	6.15E-07	1.70E-06	2.28E-05	6.11E-05	5.14E-06	4.70E-05	5.01E-06	1.17E-05
Lower Belledune - Adult	5.70E-07	2.49E-06	6.22E-07	1.72E-06	4.64E-06	5.03E-06	5.19E-07	1.43E-06	1.59E-05	4.27E-05	4.95E-06	4.53E-05	6.52E-06	1.53E-05
Belledune - Infant	1.96E-07	3.92E-07	5.70E-07	7.48E-07	8.00E-06	8.67E-06	1.75E-06	2.29E-06	5.76E-05	7.24E-05	2.50E-05	4.23E-05		
Belledune - Toddler	4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.95E-06	8.61E-06	3.47E-06	4.56E-06	3.62E-05	4.55E-05	1.16E-05	1.96E-05	8.80E-06	1.49E-05
Belledune - Child	3.37E-07	6.74E-07	3.18E-07	4.17E-07	5.32E-06	5.76E-06	4.35E-07	5.71E-07	2.79E-05	3.50E-05	8.48E-06	1.44E-05	6.49E-06	1.10E-05
Belledune - Teen	2.02E-07	4.05E-07	2.55E-07	3.35E-07	3.66E-06	3.97E-06	2.40E-07	3.15E-07	2.17E-05	2.72E-05	5.72E-06	9.68E-06	5.01E-06	8.46E-06
Belledune - Adult	1.71E-07	3.42E-07	2.43E-07	3.19E-07	4.64E-06	5.03E-06	2.03E-07	2.66E-07	1.51E-05	1.90E-05	5.52E-06	9.34E-06	6.52E-06	1.10E-05
Pointe-Verte - Infant	1.64E-07	3.29E-07	5.08E-07	6.56E-07	8.28E-06	9.48E-06	1.56E-06	2.01E-06	2.51E-05	3.25E-05	6.22E-05	1.03E-04		
Pointe-Verte - Toddler	3.62E-07	7.23E-07	3.73E-07	4.82E-07	8.23E-06	9.43E-06	3.10E-06	3.99E-06	1.58E-05	2.04E-05	2.88E-05	4.74E-05	8.80E-06	1.49E-05
Pointe-Verte - Child	2.83E-07	5.65E-07	2.84E-07	3.66E-07	5.50E-06	6.30E-06	3.88E-07	5.00E-07	1.21E-05	1.57E-05	2.11E-05	3.48E-05	6.49E-06	1.10E-05
Pointe-Verte - Teen	1.70E-07	3.40E-07	2.28E-07	2.93E-07	3.79E-06	4.34E-06	2.14E-07	2.76E-07	9.44E-06	1.22E-05	1.42E-05	2.35E-05	5.01E-06	8.46E-06
Pointe-Verte - Adult	1.43E-07	2.87E-07	2.17E-07	2.79E-07	4.80E-06	5.50E-06	1.81E-07	2.33E-07	6.60E-06	8.54E-06	1.37E-05	2.26E-05	6.52E-06	1.10E-05
Petit Rocher - Infant	2.28E-08	4.56E-08	2.33E-07	3.81E-07	7.68E-06	1.17E-05	7.12E-07	1.17E-06	3.40E-05	4.14E-05	8.33E-06	1.41E-05		
Petit Rocher - Toddler	5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.64E-06	1.17E-05	1.42E-06	2.32E-06	2.14E-05	2.60E-05	3.85E-06	6.52E-06	8.80E-06	1.49E-05
Petit Rocher - Child	3.92E-08	7.84E-08	1.30E-07	2.13E-07	5.11E-06	7.81E-06	1.78E-07	2.91E-07	1.64E-05	2.00E-05	2.83E-06	4.78E-06	6.49E-06	1.10E-05
Petit Rocher - Teen	2.35E-08	4.71E-08	1.04E-07	1.71E-07	3.52E-06	5.38E-06	9.78E-08	1.60E-07	1.28E-05	1.55E-05	1.91E-06	3.23E-06	5.01E-06	8.46E-06
Petit Rocher - Adult	1.99E-08	3.98E-08	9.91E-08	1.62E-07	4.46E-06	6.81E-06	8.26E-08	1.35E-07	8.93E-06	1.09E-05	1.84E-06	3.11E-06	6.52E-06	1.10E-05

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)	
	Inhalation		Dermal		Water		Soil		Root Veg		Other Veg		Wild Game	
Lead	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
Townsite - Infant	4.08E-05	1.00E-04	4.54E-06	7.75E-06	4.75E-05	6.54E-05	3.24E-04	5.54E-04	3.69E-05	2.73E-04	1.60E-05	4.36E-05		
Townsite - Toddler	8.99E-05	2.20E-04	3.33E-06	5.69E-06	4.72E-05	6.50E-05	6.45E-04	1.10E-03	2.32E-05	1.72E-04	7.41E-06	2.02E-05	9.06E-05	3.53E-04
Townsite - Child	7.03E-05	1.72E-04	2.53E-06	4.32E-06	3.16E-05	4.35E-05	8.08E-05	1.38E-04	1.79E-05	1.32E-04	5.44E-06	1.48E-05	6.68E-05	2.60E-04
Townsite - Teen	4.22E-05	1.03E-04	2.03E-06	3.47E-06	2.17E-05	3.00E-05	4.45E-05	7.60E-05	1.39E-05	1.03E-04	3.67E-06	9.98E-06	5.15E-05	2.01E-04
Townsite - Adult	3.56E-05	8.73E-05	1.93E-06	3.30E-06	2.75E-05	3.80E-05	3.76E-05	6.42E-05	9.71E-06	7.18E-05	3.54E-06	9.62E-06	6.71E-05	2.62E-04
Lower Belledune - Infant	3.45E-05	1.48E-04	3.94E-06	1.13E-05	4.75E-05	6.54E-05	2.82E-04	8.05E-04	3.25E-05	1.70E-04	3.14E-05	2.05E-04		
Lower Belledune - Toddler	7.59E-05	3.26E-04	2.90E-06	8.28E-06	4.72E-05	6.50E-05	5.60E-04	1.60E-03	2.04E-05	1.07E-04	1.45E-05	9.49E-05	9.06E-05	3.53E-04
Lower Belledune - Child	5.94E-05	2.55E-04	2.20E-06	6.28E-06	3.16E-05	4.35E-05	7.02E-05	2.01E-04	1.57E-05	8.22E-05	1.07E-05	6.96E-05	6.68E-05	2.60E-04
Lower Belledune - Teen	3.57E-05	1.53E-04	1.76E-06	5.04E-06	2.17E-05	3.00E-05	3.87E-05	1.11E-04	1.22E-05	6.38E-05	7.19E-06	4.70E-05	5.15E-05	2.01E-04
Lower Belledune - Adult	3.01E-05	1.29E-04	1.68E-06	4.80E-06	2.75E-05	3.80E-05	3.27E-05	9.34E-05	8.54E-06	4.46E-05	6.93E-06	4.53E-05	6.71E-05	2.62E-04
Belledune - Infant	1.04E-05	2.08E-05	1.67E-06	2.29E-06	4.75E-05	6.54E-05	1.20E-04	1.63E-04	2.44E-05	3.62E-05	1.92E-05	3.08E-05		
Belledune - Toddler	2.29E-05	4.58E-05	1.23E-06	1.68E-06	4.72E-05	6.50E-05	2.38E-04	3.25E-04	1.53E-05	2.28E-05	8.89E-06	1.42E-05	9.06E-05	2.27E-04
Belledune - Child	1.79E-05	3.58E-05	9.34E-07	1.27E-06	3.16E-05	4.35E-05	2.98E-05	4.07E-05	1.18E-05	1.75E-05	6.52E-06	1.04E-05	6.68E-05	1.67E-04
Belledune - Teen	1.08E-05	2.15E-05	7.49E-07	1.02E-06	2.17E-05	3.00E-05	1.64E-05	2.24E-05	9.16E-06	1.36E-05	4.40E-06	7.04E-06	5.15E-05	1.29E-04
Belledune - Adult	9.08E-06	1.82E-05	7.13E-07	9.74E-07	2.75E-05	3.80E-05	1.39E-05	1.89E-05	6.41E-06	9.51E-06	4.24E-06	6.79E-06	6.71E-05	1.68E-04
Pointe-Verte - Infant	9.00E-06	1.80E-05	1.54E-06	2.05E-06	9.11E-05	1.28E-04	1.10E-04	1.47E-04	8.13E-06	1.18E-05	1.60E-05	2.44E-05		
Pointe-Verte - Toddler	1.98E-05	3.96E-05	1.13E-06	1.51E-06	9.05E-05	1.27E-04	2.19E-04	2.92E-04	5.11E-06	7.43E-06	7.41E-06	1.13E-05	9.06E-05	2.27E-04
Pointe-Verte - Child	1.55E-05	3.10E-05	8.60E-07	1.15E-06	6.05E-05	8.52E-05	2.75E-05	3.66E-05	3.93E-06	5.72E-06	5.44E-06	8.26E-06	6.68E-05	1.67E-04
Pointe-Verte - Teen	9.31E-06	1.86E-05	6.90E-07	9.19E-07	4.17E-05	5.87E-05	1.51E-05	2.02E-05	3.05E-06	4.44E-06	3.67E-06	5.58E-06	5.15E-05	1.29E-04
Pointe-Verte - Adult	7.86E-06	1.57E-05	6.57E-07	8.75E-07	5.28E-05	7.43E-05	1.28E-05	1.70E-05	2.14E-06	3.11E-06	3.54E-06	5.38E-06	6.71E-05	1.68E-04
Petit Rocher - Infant	1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.07E-05	1.17E-04	5.83E-05	9.49E-05	1.03E-05	1.40E-05	4.74E-06	7.69E-06		
Petit Rocher - Toddler	2.82E-06	5.63E-06	5.99E-07	9.75E-07	6.04E-05	1.16E-04	1.16E-04	1.89E-04	6.50E-06	8.83E-06	2.19E-06	3.56E-06	9.06E-05	2.27E-04
Petit Rocher - Child	2.20E-06	4.41E-06	4.55E-07	7.40E-07	4.04E-05	7.76E-05	1.45E-05	2.36E-05	5.00E-06	6.79E-06	1.61E-06	2.61E-06	6.68E-05	1.67E-04
Petit Rocher - Teen	1.32E-06	2.65E-06	3.65E-07	5.94E-07	2.78E-05	5.35E-05	8.00E-06	1.30E-05	3.89E-06	5.27E-06	1.09E-06	1.76E-06	5.15E-05	1.29E-04
Petit Rocher - Adult	1.12E-06	2.23E-06	3.47E-07	5.65E-07	3.52E-05	6.77E-05	6.76E-06	1.10E-05	2.72E-06	3.69E-06	1.05E-06	1.70E-06	6.71E-05	1.68E-04

Revised EPCs - Marine Fish (No Mussel)

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)
	Fish		Lobster		Mussels		
Cadmium	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food
Townsite - Infant	9.15E-07	1.10E-06					6.12E-04
Townsite - Toddler	2.40E-06	2.88E-06	3.78E-07	4.55E-07			7.26E-04
Townsite - Child	6.24E-06	7.49E-06	8.76E-07	1.06E-06			7.38E-04
Townsite - Teen	3.44E-06	4.13E-06	4.83E-07	5.82E-07			4.53E-04
Townsite - Adult	3.93E-06	4.71E-06	5.51E-07	6.64E-07			3.07E-04
Lower Belledune - Infant	9.15E-07	1.10E-06					6.12E-04
Lower Belledune - Toddler	2.40E-06	2.88E-06	4.21E-07	4.72E-07			7.26E-04
Lower Belledune - Child	6.24E-06	7.49E-06	9.77E-07	1.09E-06			7.38E-04
Lower Belledune - Teen	3.44E-06	4.13E-06	5.39E-07	6.03E-07			4.53E-04
Lower Belledune - Adult	3.93E-06	4.71E-06	6.15E-07	6.88E-07			3.07E-04
Belledune - Infant	9.15E-07	1.10E-06					6.12E-04
Belledune - Toddler	2.40E-06	2.88E-06	4.10E-07	4.50E-07			7.26E-04
Belledune - Child	6.24E-06	7.49E-06	9.52E-07	1.04E-06			7.38E-04
Belledune - Teen	3.44E-06	4.13E-06	5.25E-07	5.75E-07			4.53E-04
Belledune - Adult	3.93E-06	4.71E-06	5.99E-07	6.56E-07			3.07E-04
Pointe-Verte - Infant	9.15E-07	1.10E-06					6.12E-04
Pointe-Verte - Toddler	2.40E-06	2.88E-06	3.27E-07	5.55E-07			7.26E-04
Pointe-Verte - Child	6.24E-06	7.49E-06	7.58E-07	1.29E-06			7.38E-04
Pointe-Verte - Teen	3.44E-06	4.13E-06	4.18E-07	7.10E-07			4.53E-04
Pointe-Verte - Adult	3.93E-06	4.71E-06	4.76E-07	8.10E-07			3.07E-04
Petit Rocher - Infant	9.15E-07	1.10E-06					6.12E-04
Petit Rocher - Toddler	2.40E-06	2.88E-06	3.78E-07	6.09E-07			7.26E-04
Petit Rocher - Child	6.24E-06	7.49E-06	8.76E-07	1.41E-06			7.38E-04
Petit Rocher - Teen	3.44E-06	4.13E-06	4.83E-07	7.79E-07			4.53E-04
Petit Rocher - Adult	3.93E-06	4.71E-06	5.51E-07	8.89E-07			3.07E-04

TRV 1.00E-03 1.00E-03

Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
7.83E-07	1.98E-06	1.71E-06	2.83E-06	7.11E-04	9.44E-04	7.13E-04	9.49E-04
1.72E-06	4.35E-06	1.26E-06	2.08E-06	8.06E-04	9.63E-04	8.09E-04	9.69E-04
1.35E-06	3.40E-06	9.56E-07	1.58E-06	7.96E-04	9.12E-04	7.99E-04	9.17E-04
8.09E-07	2.04E-06	7.68E-07	1.27E-06	4.95E-04	5.83E-04	4.97E-04	5.87E-04
6.83E-07	1.72E-06	7.30E-07	1.20E-06	3.45E-04	4.14E-04	3.46E-04	4.16E-04
6.53E-07	2.86E-06	1.46E-06	4.04E-06	7.08E-04	1.00E-03	7.11E-04	1.01E-03
1.44E-06	6.29E-06	1.07E-06	2.97E-06	8.03E-04	9.80E-04	8.05E-04	9.89E-04
1.12E-06	4.92E-06	8.15E-07	2.25E-06	7.95E-04	9.19E-04	7.97E-04	9.26E-04
6.75E-07	2.95E-06	6.54E-07	1.81E-06	4.94E-04	5.83E-04	4.95E-04	5.88E-04
5.70E-07	2.49E-06	6.22E-07	1.72E-06	3.44E-04	4.22E-04	3.45E-04	4.26E-04
1.96E-07	3.92E-07	5.70E-07	7.48E-07	7.05E-04	7.39E-04	7.06E-04	7.40E-04
4.31E-07	8.62E-07	4.19E-07	5.50E-07	7.97E-04	8.22E-04	7.98E-04	8.24E-04
3.37E-07	6.74E-07	3.18E-07	4.17E-07	7.94E-04	8.13E-04	7.94E-04	8.14E-04
2.02E-07	4.05E-07	2.55E-07	3.35E-07	4.93E-04	5.07E-04	4.94E-04	5.08E-04
1.71E-07	3.42E-07	2.43E-07	3.19E-07	3.44E-04	3.57E-04	3.44E-04	3.58E-04
1.64E-07	3.29E-07	5.08E-07	6.56E-07	7.10E-04	7.60E-04	7.11E-04	7.61E-04
3.62E-07	7.23E-07	3.73E-07	4.82E-07	7.93E-04	8.26E-04	7.94E-04	8.27E-04
2.83E-07	5.65E-07	2.84E-07	3.66E-07	7.91E-04	8.15E-04	7.91E-04	8.16E-04
1.70E-07	3.40E-07	2.28E-07	2.93E-07	4.90E-04	5.07E-04	4.90E-04	5.07E-04
1.43E-07	2.87E-07	2.17E-07	2.79E-07	3.43E-04	3.60E-04	3.44E-04	3.61E-04
2.28E-08	4.56E-08	2.33E-07	3.81E-07	6.64E-04	6.81E-04	6.64E-04	6.82E-04
5.01E-08	1.00E-07	1.71E-07	2.80E-07	7.72E-04	7.91E-04	7.72E-04	7.91E-04
3.92E-08	7.84E-08	1.30E-07	2.13E-07	7.76E-04	7.91E-04	7.76E-04	7.91E-04
2.35E-08	4.71E-08	1.04E-07	1.71E-07	4.80E-04	4.91E-04	4.80E-04	4.91E-04
1.99E-08	3.98E-08	9.91E-08	1.62E-07	3.33E-04	3.45E-04	3.33E-04	3.45E-04

Current Baseline + Project	Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)		Intake (mg/kg d)
	Fish		Lobster		Mussels		
Lead	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Supermarket Food
Townsite - Infant	5.79E-07	7.93E-07					4.69E-04
Townsite - Toddler	1.52E-06	2.08E-06	3.05E-06	6.21E-06			4.81E-04
Townsite - Child	3.95E-06	5.41E-06	7.09E-06	1.44E-05			3.68E-04
Townsite - Teen	2.18E-06	2.98E-06	3.90E-06	7.94E-06			2.24E-04
Townsite - Adult	2.49E-06	3.40E-06	4.46E-06	9.06E-06			1.83E-04
Lower Belledune - Infant	5.79E-07	7.93E-07					4.69E-04
Lower Belledune - Toddler	1.52E-06	2.08E-06	5.42E-06	6.91E-06			4.81E-04
Lower Belledune - Child	3.95E-06	5.41E-06	1.26E-05	1.60E-05			3.68E-04
Lower Belledune - Teen	2.18E-06	2.98E-06	6.92E-06	8.84E-06			2.24E-04
Lower Belledune - Adult	2.49E-06	3.40E-06	7.90E-06	1.01E-05			1.83E-04
Belledune - Infant	5.79E-07	7.93E-07					4.69E-04
Belledune - Toddler	1.52E-06	2.08E-06	4.83E-06	6.13E-06			4.81E-04
Belledune - Child	3.95E-06	5.41E-06	1.12E-05	1.42E-05			3.68E-04
Belledune - Teen	2.18E-06	2.98E-06	6.17E-06	7.83E-06			2.24E-04
Belledune - Adult	2.49E-06	3.40E-06	7.04E-06	8.94E-06			1.83E-04
Pointe-Verte - Infant	5.79E-07	7.93E-07					4.69E-04
Pointe-Verte - Toddler	1.52E-06	2.08E-06	3.35E-06	5.45E-06			4.81E-04
Pointe-Verte - Child	3.95E-06	5.41E-06	7.77E-06	1.26E-05			3.68E-04
Pointe-Verte - Teen	2.18E-06	2.98E-06	4.28E-06	6.96E-06			2.24E-04
Pointe-Verte - Adult	2.49E-06	3.40E-06	4.89E-06	7.95E-06			1.83E-04
Petit Rocher - Infant	5.79E-07	7.93E-07					4.69E-04
Petit Rocher - Toddler	1.52E-06	2.08E-06	3.18E-06	6.02E-06			4.81E-04
Petit Rocher - Child	3.95E-06	5.41E-06	7.38E-06	1.40E-05			3.68E-04
Petit Rocher - Teen	2.18E-06	2.98E-06	4.07E-06	7.69E-06			2.24E-04
Petit Rocher - Adult	2.49E-06	3.40E-06	4.64E-06	8.78E-06			1.83E-04

TRV 3.60E-03 3.60E-03

Total Inhalation (mg/kg d)		Total Dermal (mg/kg d)		Total Ingestion (mg/kg d)		Total Intake (mg/kg d)	
Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound	Best Estimate	Upper Bound
4.08E-05	1.00E-04	4.54E-06	7.75E-06	8.94E-04	1.41E-03	9.40E-04	1.51E-03
8.99E-05	2.20E-04	3.33E-06	5.69E-06	1.30E-03	2.20E-03	1.39E-03	2.43E-03
7.03E-05	1.72E-04	2.53E-06	4.32E-06	5.82E-04	9.77E-04	6.54E-04	1.15E-03
4.22E-05	1.03E-04	2.03E-06	3.47E-06	3.65E-04	6.54E-04	4.10E-04	7.61E-04
3.56E-05	8.73E-05	1.93E-06	3.30E-06	3.35E-04	6.41E-04	3.73E-04	7.31E-04
3.45E-05	1.48E-04	3.94E-06	1.13E-05	8.63E-04	1.72E-03	9.01E-04	1.88E-03
7.59E-05	3.26E-04	2.90E-06	8.28E-06	1.22E-03	2.71E-03	1.30E-03	3.04E-03
5.94E-05	2.55E-04	2.20E-06	6.28E-06	5.79E-04	1.05E-03	6.41E-04	1.31E-03
3.57E-05	1.53E-04	1.76E-06	5.04E-06	3.64E-04	6.88E-04	4.02E-04	8.46E-04
3.01E-05	1.29E-04	1.68E-06	4.80E-06	3.36E-04	6.79E-04	3.68E-04	8.13E-04
1.04E-05	2.08E-05	1.67E-06	2.29E-06	6.80E-04	7.66E-04	6.92E-04	7.89E-04
2.29E-05	4.58E-05	1.23E-06	1.68E-06	8.87E-04	1.14E-03	9.11E-04	1.19E-03
1.79E-05	3.58E-05	9.34E-07	1.27E-06	5.30E-04	6.67E-04	5.48E-04	7.04E-04
1.08E-05	2.15E-05	7.49E-07	1.02E-06	3.36E-04	4.37E-04	3.47E-04	4.59E-04
9.08E-06	1.82E-05	7.13E-07	9.74E-07	3.12E-04	4.37E-04	3.22E-04	4.56E-04
9.00E-06	1.80E-05	1.54E-06	2.05E-06	6.95E-04	7.81E-04	7.06E-04	8.01E-04
1.98E-05	3.96E-05	1.13E-06	1.51E-06	8.99E-04	1.15E-03	9.20E-04	1.19E-03
1.55E-05	3.10E-05	8.60E-07	1.15E-06	5.44E-04	6.89E-04	5.60E-04	7.21E-04
9.31E-06	1.86E-05	6.90E-07	9.19E-07	3.46E-04	4.52E-04	3.56E-04	4.71E-04
7.86E-06	1.57E-05	6.57E-07	8.75E-07	3.29E-04	4.62E-04	3.37E-04	4.79E-04
1.28E-06	2.56E-06	8.15E-07	1.33E-06	6.04E-04	7.03E-04	6.06E-04	7.07E-04
2.82E-06	5.63E-06	5.99E-07	9.75E-07	7.61E-04	1.03E-03	7.65E-04	1.04E-03
2.20E-06	4.41E-06	4.55E-07	7.40E-07	5.08E-04	6.65E-04	5.10E-04	6.70E-04
1.32E-06	2.65E-06	3.65E-07	5.94E-07	3.23E-04	4.37E-04	3.24E-04	4.40E-04
1.12E-06	2.23E-06	3.47E-07	5.65E-07	3.03E-04	4.47E-04	3.04E-04	4.50E-04

APPENDIX G

Statistical Methods

Jacques

Analysis of Variance (ANOVA)

Analysis of Variance (ANOVA) is the preferred way of comparing data that are regarded as random samples from different populations. A typical t-test on each pair has many problems when doing multiple comparisons. The probability of false rejection of the null hypothesis might be higher than it appears to be. There is a lack of structure in the groups by testing individually with t-tests that can be eliminated with ANOVA. As well, the ANOVA eliminates the standard deviation of each individual sample, and combines the variability to improve precision in the analysis.

The basic formula applied to the ANOVA uses the following notation:

$$SS_T = \sum x^2 - \frac{(\sum x_T)^2}{N}$$

$$SS_b = \sum \frac{(\sum x.)^2}{n} - \frac{(\sum x_T)^2}{N}$$

$$SS_w = SS_T - SS_b$$

$$df_b = \text{(number of groups - 1)}$$

$$df_T = \text{(number of subjects - 1)}$$

$$df_w = df_T - df_b$$

$$MS_b = \frac{SS_b}{df_b}$$

$$MS_w = \frac{SS_w}{df_w}$$

$$F = \frac{MS_b}{MS_w}$$

Box and Whisker Plots

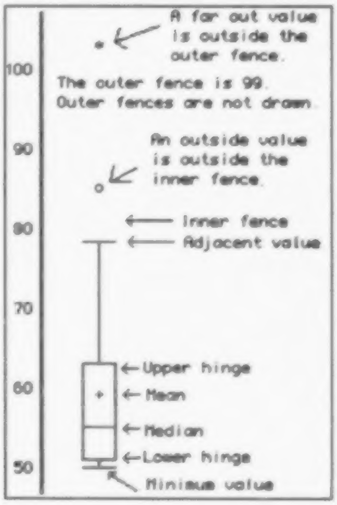
One of the most efficient graphics, both for examining a single distribution and for making comparisons between distributions, is known as a boxplot.

The median of a distribution splits the distribution into two parts, a lower part and an upper part.

The quartiles of a distribution divide each of these parts in half, thereby dividing the distribution into four quarters. The first quartile is the median of the data values in the lower half of the data set and the third quartile is the median of the data values in the upper half of the data set.

A boxplot is a visual representation of the minimum, first quartile, median, third quartile, and maximum. The box connects the quartiles to the mean. Finally we extend "whiskers" from the first quartile down to the minimum and from the third quartile to the maximum.

If there are outliers in the upper or lower part of the distribution, then we identify them with asterisks (*) and extend the whisker to the minimum or maximum observation that is not an outlier.


A far out value is outside the outer fence.
100
The outer fence is 99.
Outer fences are not drawn.
90
An outside value is outside the inner fence.
80
Inner fence
Adjacent value
70
Upper hinge
60
Mean
Median
Lower hinge
50
Minimum value

APPENDIX H

Soil Zones

Jacques

Northern New Brunswick Uplands

There are a range of factors and physical processes that will influence soil development and chemistry in a specific soil zone, each of which may not result in the same conclusions. Sources that were reviewed to define New Brunswick soil zones included:

- Geomorphology;
- Federal and Provincial ecoregion mapping;
- Bedrock geology maps;
- Surficial geology maps;
- Soil development; and
- Other available databases of natural resource information (e.g., forest soils)

The Northern New Brunswick Uplands occupies the northwestern region of New Brunswick, and includes the majority of the Edmundston Highlands and the Chaleur Uplands, but does not include the Saint John River Valley. The ecoregion has warm, moist summers with a mean temperature of 14.5°C and snowy, cold winters, with a mean temperature of 3.5°C, and precipitation ranging from 1000-1200 mm. The forest is composed of mixed hardwoods such as sugar maple, beech, and yellow birch in elevated areas and eastern hemlock, balsam fir, eastern white pine, and white spruce are common in valley areas.

Bedrock in the area is comprised of metasedimentary rocks from the Paleozoic Era (Ordovician to Devonian) with stony glacial deposits and bedrock outcroppings. Soils consist of Loamy Humo-Ferric and Ferro-Humic Podzols. Many of the typical inhabitants of the province including moose, black bear, white-tailed deer, beavers etc., as well as seabirds along the coast of Chaleur Bay are common.

Jacques